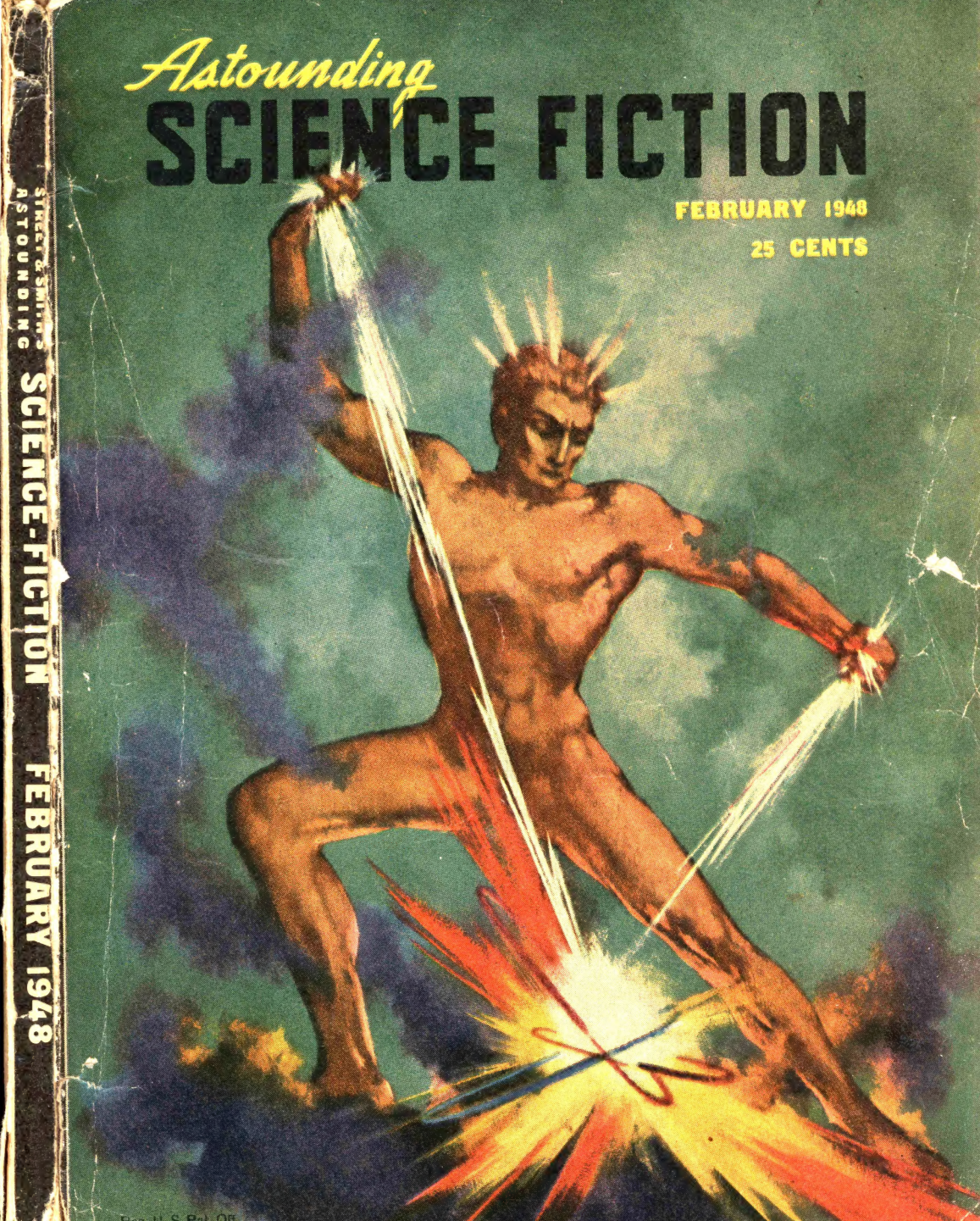
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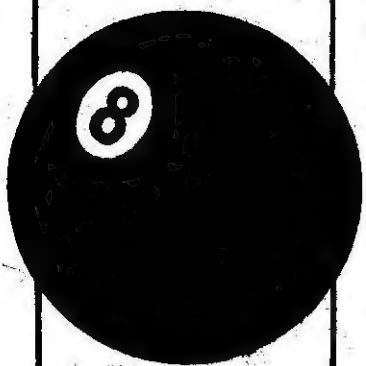

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COVER BY ALEJANDRO

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Illustrations by Davis, Napoli, Orban and Rogers

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$2.50 per Year in U. S. A. Printed in [redacted] the U. S. A. 25c per Copy

NEXT ISSUE ON SALE FEBRUARY 17, 1948

MEGOPOLIS

We, products of an Age of Cities, find it hard to consider a cityless, or near-cityless culture. But it looks more and more as though the New York City of today is a phenomenon unique in the history of Man—truly unique in that nothing like it existed before, and nothing like it will ever again exist. The super-giant city is a passing phenomenon of unstable culture—a thing that does and can exist only between two periods.

Actually, to build New York as it is, high development of large machines is essential—it takes large machines to roll girders, hoist giant beams, move the immense tonnage of skyscrapers. It takes great machines to build the tunnels and bridges that handle the traffic of a gigantic metropolis. Before those things become available, the super-giant city can't exist. Certainly a city sprawling over a thirty-mile radius can't come into existence when horse-and-wagon transportation is the only available means of shipping supplies. Only when a mechanical transportation age starts can such a city exist.

But when transportation is good, fast, economical—then the city has no reason for existence. If transportation can cover hundreds of miles, there's no need to concentrate in a few tens of miles. In fact, there's every reason for *not* concentrating. At present, New York, like the other super-metropolitan centers Los Angeles, Chicago, London and others, is suffering hardening of the traffic arteries. New Yorkers can't own automobiles; there isn't room for them. Angleanos can—in fact must, because of the widespread city. But they're traffic bound, too. The cities are too big. The light plane, that should help solve the average man's transportation problems, is impossible in the city areas—no room for landing fields.

Suppose we had those trick walls that Van Vogt uses in his stories—the ultimate in transportation. You simply step through the wall, and are at your destination. That would unfreeze the traffic arteries of the cities—perhaps. (Van Vogt doesn't say how those walls are tuned to each other, but it's worth noting that the 30,000,000,000 cycle spec-

trum of radio is completely clogged, or will be when apparatus already ordered is installed. All the distinguishing characteristics of frequency, polarization and direction available in the microwave spectrum are already needed in New York for communications services. There would be a limit to the number of "walls" that could be installed probably—but let's ignore it.) Still, the city can't exist. If it's as easy to cross a thousand miles as to cross a corridor, through one of those walls—why concentrate in the cities, when all the world is available, and real estate is cheap?

The super-giant city can, apparently, come into being and exist only during the period between the time transportation is just good enough to allow sufficient food and other supplies to reach the city, but before transportation is so good that remoter, pleasanter areas can be equally accessible.

All these conditions are, of course, aside from the basic original reason for the rise of cities—and their present situation. The cities started—actually small towns, in the modern sense—as defense centers, as forts wherein the population behind the city walls was safe from the nomad attackers. The location of the larger cities was determined then, too, by transportation—the only cheap, high-capacity transportation they had at the time. And that meant a good harbor, whether on a large navigable river, or on a sea.

Today, of course, the defense picture is reversed. The threat of atomic warfare is leveled almost solely against cities, but eventually that threat will pass, too, as far more advanced science finds a real answer. Still—the super-giant city will be impractical. The same advanced science will, unquestionably, improve transportation, which is the death of cities.

The interstellar exploration commanders needn't worry too much about investigating the worlds which have great cities; they won't have attained any such high level of transportation as a faster-than-light ship. The ones to approach with care will be the pastoral worlds, with small private air vehicles darting from little country town to small village to private farm-cottage.

THE EDITOR.

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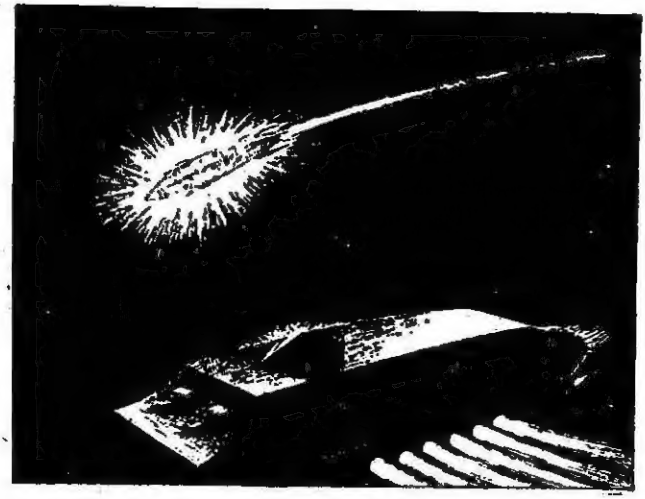


BY THEODORE STURGEON

THERE IS NO DEFENSE

1

In the first place, it isn't true that "It takes two to make a quarrel." And in the end, it's proven that it takes nobody to make a very deadly quarrel indeed.

Illustrated by Pat Davis

Cursing formality, Belter loosened his tunic and slouched back in his chair. He gazed at each of the members of the Joint Solar Military Council in turn, and rasped: "You might as well be comfortable, because, so help me, if I have to chain you to this table from now until the sun freezes, I'll run off this record over and over again until someone figures an angle. I never heard of anything yet, besides The Death, that couldn't be whipped one way or another. There's a weakness somewhere in this thing. It's got to be on the record. So we'll just keep at the record until we find it. Keep your eyes peeled and the hair out of your eyes. That goes for you too, Leess."

The bottled Jovian shrugged hugely. The infrared sensory organ on its cephalothorax flushed as Belter's words crackled through the translator. Glowering at the creature, Belter quenched a flash of sympathy. The Jovian was a prisoner in other things besides the bottle which supplied its atmosphere and gravity. Leess represented a dis-

graced and defeated race, and its position at the conference table was a hollow honor—a courtesy backed by heat and steel and The Death. But Belter's glower did not change. There was no time, now, to sympathize with those whose fortunes of war were all bad ones.

Belter turned to the orderly and nodded. A sigh, compounded of worry and weariness, escaped the council as one man. The lights dimmed, and again the record appeared on the only flat wall of the vast chamber.

First the astronomical data from the Plutonian Dome, showing the first traces of the Invader approaching from the direction of the Lyran Ring — Equations, calculations, a sketch, photographs. These were dated three years back, during the closing phases of the Jovian War. The Plutonian Dome was not serviced at the time, due to the emergency. It was a completely automatic observatory, and its information was not needed during the interplanetary trouble. Therefore it was not equipped with instantaneous transmission, but neatly reeled up its information until it could be visited after the war. There was a perfectly good military observation base on Outpost, the retrograde moon of Neptune, which was regarded as quite adequate to watch the Solar System area. That is, there *had* been a base there—

But, of course, the Invader was well into the System before anyone saw the Pluto records, and by that time—

The wall scene faded into the transcript of the instantaneous message received by Terran HQ, which was rigged to accept any alarm from all of the watch posts.

The transcript showed the interior of the Neptunian military observatory, and cut in apparently just before the Sigmen heard the alarm. One was sprawled in a chair in front of the finder controls; the other, a rangy lieutenant with the burned skin of his Martian Colonial stock, stiffened, looked up at the blinking "General Alarm" light as the muted, insistent note of the "Stations" bell began to thrum from the screen. The sound transmission was very good; the councilmen could distinctly hear the lieutenant's sharp intake of breath, and his voice was quite clear as he rapped:

"Colin! Alarm. Fix!"

"Fix, sir," said the enlisted man, his fingers flying over the segmented controls. "It's deep space, sir," he reported as he worked. "A Jovian, maybe—flanking us."

"I don't think so. If what's left of their navy could make any long passes at all, you can bet it would be at Earth. How big is it?"

"I haven't got . . . oh, here it is, sir," said the e.m. "An object about the size of a Class III-A Heavy."

"Ship?"

"Don't know, sir. No heat radiation from any kind of jets. And the magnetoscope is zero."

"Get a chaser on him."

Belter's hands tightened on the table edge. Every time he saw this part of the record he wanted to get up and yell, *"No, you idiot! It'll*

walk down your beam!" The chaserscope would follow anything it was trained on, and bring in a magnified image. But it took a mess of traceable vhf to do it.

Relaxing was a conscious effort. *Must be slipping,* he thought glumly, *wanting to yell at those guys. Those guys are dead.*

In the picture recording, a projection of the chaserscope's screen was flashed on the observatory screen. Staring fearfully at this shadow-picture of a shadow-picture, the council saw again the familiar, terrible lines of the Invader—squat, unlovely, obviously not designed for atmospheric work; slab-sided, smug behind what must have been foolproof meteor screens, for the ship boldly presented flat side and bottom plates to anything which might be thrown at her.

"It's a ship, sir!" said the e.m. unnecessarily. "Seems to be turning on its short axis. Still no drive emanations."

"Range!" said the lieutenant into a wall mike. Three lights over it winked on, indicating the batteries were manned and ready for ranging information. The lieutenant, his eyes fixed on the large indicators over the enlisted man's head, hesitated a moment, then said· "Automatics! Throw your ranging gear to our chaser."

The three lights blinked, once each. The battery reporters lit up, showing automatic control as the medium and heavy launching tubes bore round to the stranger.

The ship was still on the screen, turning slowly. Now a dark patch on her flank could be seen—an open port. There was a puff of escaping gas, and *something* appeared whirling briefly away from the ship, toward the scanner. They almost saw it clearly—and then it was gone.

"They threw something at us, sir!"

"Track it!"

"Can't sir!"

"You saw the beginning of that trajectory! It was coming this way."

"Yes, sir. But the radar doesn't register it. I don't see it on the screen either. Maybe it's a warper?"

"Warpers are all theory, Colin. You don't bend radar impulses around an object and then restore them to their original direction. If this thing is warping at all, it's warping light. It—"

And then all but the Jovian closed their eyes as the screen repeated that horror—the bursting inward of the observatory's bulkhead, the great jagged blade of metal that flicked the lieutenant's head straight into the transmission camera.

The scene faded, and the lights went up.

"Slap in the next re— Hold it!" Belter said. "What's the matter with Hereford?"

The Peace delegate was slumped in his chair, his head on his arms, his arms on the table. The Martian Colonial representative touched him, and Hereford raised his seamed, saintly face:

"Sorry."

"You sick?"

Hereford sat back tiredly. "Sick?" he repeated vaguely. He was not a young man. Next to that of the Jovian, his position was the strangest of all. He represented a group, as did each of the others. But not a planetary group. He represented the amalgamation of all organized pacifistic thought in the System. His chair on the Joint Solar Military Council was a compromise measure, the tentative answer to an apparently unanswerable question—can a people do without the military? Many thought people could. Some thought not. To avoid extremism either way, the head of an unprecedented amalgamation of peace organizations was given a chair on the JSMC. He had the same vote as a planetary representative. "Sick?" he repeated in a whispering baritone. "Yes, I rather think so." He waved a hand at the blank wall. "Why did the Invader do it? So pointless . . . so . . . so stupid." He raised puzzled eyes, and Belter felt a new kind of sympathy. Hereford's hollow-ground intelligence was famous in four worlds. He was crackling, decisive; but now he could only ask the simplest of questions, like a child too tired to be badly frightened.

"Yeah—why?" asked Belter. "Oh . . . never mind the rest of the record," he added suddenly. "I don't know how the rest of you feel, but at the moment I'm hypnotized by the jet-blasted thing.

"*Why*, Hereford wants to know. If we knew that, maybe we could plan something. Defenses, anyway."

Somebody murmured: "It's not a campaign. It's murder."

"That's it. The Invader reaches out with some sort of a short-range disrupting bomb and wipes out the base on Outpost. Then it wanders into the System, washes out an uninhabited asteroid beacon, drifts down through the shield-screening of Titan and kills off half the population with a cyanogen synthesizing catalyst. It captures three different scanner-scouts, holding them with some sort of a tractor beam, whirling them around like a stone on a string, and letting them go straight at the nearest planet. Earth ships, Martian, Jovian—doesn't matter. It can outfly and outfight anything we have so far, except—"

"Except The Death," whispered Hereford. "Go on, Belter. I knew it was coming to this."

"Well, it's true! And then the cities. If it ever drops a disrupter like that"—he waved at the wall, indicating the portion of the record they had just seen—"on a large city, there wouldn't be any point in even looking for it, let alone rebuilding it. We can't communicate with the Invader—if we send out a general signal it ignores us, and if we send out a beam it charges us or sends one of those warping disrupter bombs. We can't even surrender to it! It just wanders through the System, changing course and speed from moment to moment, and every once in a while taking a crack at something."

The Martian member glanced at Hereford, and then away. "I don't see why we've waited so long. I

saw Titan, Belter. In another century it'll be dead as Luna." He shook his head. "No pre-Peace agreement can stand in the way of the defense of the System, no matter how solemn the agreement was. I voted to outlaw The Death, too. I don't like the idea of it any more than . . . than Hereford there. But circumstances alter cases. Are we going to sacrifice everything the race has built just for an outdated principle? Are we going to sit smugly behind an idealistic scrap of paper while some secret weapon chops us down bit by bit?"

"Scrap of paper," said Hereford. "Son, have you read your ancient history?"

The translator hissed. Through it, Leess spoke. The flat, unaccented words were the barest framework for the anger which those who knew Jovians could detect by the sudden paling of the creature's sensory organ. "Leess object phrase secret weapon. Man from Mars suggest Invader Jovian work."

"Cool down, Leess," Belter said, reaching over and firmly putting the Martian back in his seat. "Hey you —watch your language or you'll go back to the canals to blow the rust off supersoy. Now, Leess; I rather think the delegate from Mars let his emotions get the better of him. No one thinks that the Invader is Jovian. It's from deep space somewhere. It has a drive far superior to anything we've got, and the armament . . . well, if Jupiter had anything like that, you wouldn't have lost the war. And then there was Titan. I don't think Jovians would kill off so many of their own just to camouflage a new secret weapon."

The Martian's eyebrow lifted a trifle. Belter frowned, and the Martian's face went forcibly blank. The Jovian relaxed.

Addressing the Council generally, but looking at the Martian, Belter gritted: "The war is over. We're all Solarians, and the Invader is a menace to our System. After we get rid of the Invader we'll have time to tangle with each other. Not before. Is that clear?"

"No human trust Jupiter. No man trust Leess," sulked the Jovian. "Leess no think. Leess no help. Jupiter better off dead than not trusted."

Belter threw up his hands in disgust. The sensitivity and stubbornness of the Jovian were well known. "If there's a clumsy, flat-footed way of doing things, a Martian'll find it," he growled. "Here we need every convolution of every brain here. The Jovian has a way of thinking different enough so he might help us crack this thing, and you have to go and run him out on strike."

The Martian bit his lips. Belter turned to the Jovian. "Leess, please —come off your high horse. Maybe the Solar System is a little crowded these days, but we all have to live in it. Are you going to co-operate?"

"No. Martian man no trust Jupiter. Mars die, Jupiter die, Earth die. Good. Nobody not trust Jupiter." The creature creased inward upon itself, a movement as indicative as the thrusting out of a lower lip.

"Leess is in this with the rest of us," said the Martian. "We ought to—"

"That'll do!" barked Belter. "You've said enough, chum. Concentrate on the Invader and leave Leess alone. He has a vote on this council, and by the same token, he has the right to refrain from voting."

"Whose side are you on?" flashed the Martian, rising.

Belter came up with him, but Hereford's soft, deep voice came between them like a barrier. The Peace delegate said: "He's on the side of the System. All of us must be. We have no choice. You Martians are fighting men. Do you think you can separate yourselves from the rest of us and stop the Invader?"

Flushed, the Martian opened his mouth, closed it again, sat down. Hereford looked at Belter, and he sat down, too. The tension in the chamber lessened, but the matter obviously relegated itself to the "For Further Action" files in at least two men's minds.

Belter gazed at his fingers until they would be still without effort, and then said quietly: "Well, gentlemen, we've tried everything. There is no defense. We've lost ships, and men, and bases. We will lose more. If the Invader can be destroyed, we can be sure of a little time, at least, for preparation."

"Preparation?" asked Hereford.

"Certainly! You don't think for a minute that that ship isn't, or won't soon be, in communication with its own kind? Suppose we can't destroy it. It will be able to go back where it came from, with the news that there's a culture here for the taking, with no weapon powerful enough to touch them. You can't be so naive as to believe that this one ship is the only one they have, or the only one we'll ever see! Our only course is to wipe out this ship and then prepare for a full-scale invasion. If it doesn't come before we're prepared, our only safe course will be to carry the invasion to them, wherever they may be!"

Hereford shook his head sadly. "The old story."

Belter's fist came down with a crash. "Hereford. I *know* that Amalgamated Peace is a great cultural stride forward. I *know* that to de-condition the public on three planets and a hundred colonies from the peaceful way of life is a destructive move. But—can you suggest a way of keeping the peaceful way and saving our System? Can you?"

"Yes . . . if . . . if the Invaders can be persuaded to follow the peaceful way."

"When they won't communicate? When they commit warlike acts for nothing—without plan, without conquest, apparently for the sheer joy of destruction? Hereford—we're not dealing with anything Solarian. This is some life-form that is so different in its aims and its logic that the only thing we can do is reciprocate. Fire with fire! You talk of your ancient history. Wasn't fascism conquered when the democratic nations went all but fascist to fight them?"

"No," said Hereford firmly. "The fruits of fascism were conquered. Fascism itself was conquered only by democracy."

Belter shook his head in puzzlement. "That's irrelevant. I . . . think," he added, because he was an honest man. "To get back to the Invader: we have a weapon with which we can destroy him. We can't use it now because of Peace Amalgamated; because the Solarian peoples have determined to outlaw it forever. The law is specific: The Death is not to be used for any purposes, under any circumstances. We, the military, can say we want it until our arteries harden, but our chances of getting it are negligible unless we have public support in repealing the law. The Invader has been with us for eighteen months or more, and in spite of his depredations, there is still no sign that the public would support repeal. Why?" He stabbed out a stumpy forefinger. "Because they follow *you*, Hereford. They have completely absorbed your quasi-religious attitude of . . . what was your phrase?"

"'Moral Assay.'"

"Yeah—Moral Assay. The test of cultural stamina. The will power to stand up for a principle in spite of emergencies, in spite of drastic changes in circumstances. A good line, Hereford, but unless you retract it, the public won't. We could bulldoze 'em into it, maybe; and maybe we'd have a revolution on our hands, get a lot of people killed, and wind up with a bunch of dewy-eyed idealists coming out on top, ready to defend the principles of peace with guns if they have to draft every able-bodied Solarian in the System. Meanwhile, the Invader—and perhaps, by that time, his pals—will continue to circulate around, taking a crack at any target he happens to admire. Already the crackpots are beginning to yell about the Invader being sent to test their love of peace, and calling this the second year of the Moral Assay."

"He won't back down," said the Martian suddenly. "Why should he? The way he is, he's set for life."

"You have a lousy way of putting things!" snapped Belter, wondering *How much does personal power mean to the old saint?*

"Why this pressure?" asked Hereford gently. "You, Belter, with your martial rationalizing, and our Martian colleague here, with his personal insults—why not put it to a vote?"

Belter studied him. Was there a chance that the old man would accept the wishes of the majority here? The majority opinion of the Council was not necessarily the majority opinion of the System. And besides—how many of the Council would go along with Hereford if he chose to vote against it?

He took a deep breath. "We've got to know where we stand," he said. "Informally, now—shall we use The Death on the Invader? Let's have a show of hands."

There was a shuffling of feet. All the men looked at Hereford, who sat still with his eyes downcast. The Martian raised his hand defiantly. The Phoebe-Titan Colonial delegate

followed suit. Earth. The Belt. Five, six—eight. Nine.

"Nine," said Belter. He looked at the Jovian, who looked back, unblinking. Not voting. Hereford's hands were on the table.

"That's three-quarters," Belter said.

"Not enough," answered Hereford. "The law stipulates *over* three-quarters."

"You know what my vote is."

"Sorry, Belter. You can't vote. As chairman, you are powerless unless all members vote, and then all you can do is establish a tie so that the matter can be referred for further discussion. The regulations

purposely keep a deciding vote out of the Chair, and with the membership. I . . . frankly, Belter, I can't be expected to go further than this. I have refrained from voting. I have kept you from voting. If that keeps The Death from being used—"

Belter's knuckles cracked. He thought of the horror at Outpost, and the choking death on Titan, and what had happened to their asteroid. It and its abandoned mine workings had flared up like a baby nova, and what was left wouldn't dirty a handkerchief. It was a fine thing for every Solarian that at long last a terrible instrument of war had been outlawed, this time by the unquestionable wish of the people. It would be a bad thing for civilization if an exception should be made to this great rule. It was conceivable that, once the precedent was established, the long-run effects on civilization would be worse than anything the Invader could do. And yet—all his life Belter had operated under a philosophy which dictated action. Do something. It may be wrong, but—*do* something.

"May I speak with you alone?" he asked Hereford.

"If it is a matter which concerns the Council—"

"It concerns you only. A matter of ideology."

Hereford inclined his head and rose. "This won't take long," said Belter over his shoulder, as he let the peace delegate precede him into an antechamber.

"Beat it, Jerry," he said to the guard. The man saluted and left.

Belter leaned back against a desk, folded his arms and said: "Hereford, I'm going to tear this thing right down to essentials. If I don't, we can spend the rest of our lives in arguing about social necessities and cultural evolution and the laws of probability as applied to the intentions of the Invader. I am going to ask you some questions. Simple ones. Please try to keep the answers simple."

"You know I prefer that."

"You do. All right—the whole basis of the Peace movement is to prevent fighting, on the grounds that there is always a better way. Right?"

"That is right."

"And the Peace movement recognizes no need for violence in any form, and no conceivable exception to that idea."

"That is right."

"Hereford—pay close attention. You and I are in here because of the Invader, and because of the refusal of Peace Amalgamated to allow the use of the only known countermeasure."

"Obviously."

"Good. Just one more thing. I hold you in higher regard than any other man I know. And the same goes for the work you have done. Do you believe that?"

Hereford smiled slowly and nodded. "I believe it."

"Well, it's true," said Belter, and with all his strength brought his open hand across Hereford's mouth.

The older man staggered back and stood, his fingers straying up to his face. In his eyes was utter unbelief as he stared at Belter, who stood

again with his arms folded, his face impassive. The disbelief was slowly clouded over by puzzlement, and then hurt began to show. "Why—"

But before he could say another word, Belter was on him again. He crossed to Hereford's chest, and when the Peace delegate's hands came down, he struck him twice more on the mouth. Hereford made an inarticulate sound and covered his face. Belter hit him in the stomach.

Hereford moaned, turned, and made for the door. Belter dove, tackled him. They slid into a thrashing heap on the soft carpeting. Belter rolled clear, pulled the other to his feet and hit him again. Hereford shook his head and began to sink down, his arms over his head. Belter lifted him again, waited for just the right opening, and his hand flashed through for still another stinging slap across the mouth. Hereford grunted, and before Belter quite knew what was happening, he came up with one great blasting right that landed half on Belter's dropped chin, half on his collar bone. Belter came up off the floor in a cloud of sparks and fell heavily six feet away. He looked up to see Hereford standing over him, big fists bunched.

"Get up," said the Peace delegate hoarsely.

Belter lay back, put his hands under his head, spat out some blood, and began to laugh.

"Get up!"

Belter rolled over and got slowly to his feet. "It's all over, Hereford. No more rough stuff, I promise you."

Hereford backed off, his face working. "Did you think," he spat, "that you could resort to such childish, insane measures to force me into condoning murder?"

"Yup," said Belter.

"You're mad," said Hereford, and went to the door.

"Stop!"

There was a note of complete command in Belter's voice. It was that note, and the man behind it, which had put Belter where he was. Equally startling was the softness of his voice as he said: "Please come here, Hereford. It isn't like you to leave a thing half understood."

If he had said "Half-finished," he would have lost the play. Hereford came slowly back, saying ruefully: "I know you, Belter. I know there's a reason for this. But it better be good."

Belter stood where he had been, leaning against the desk, and he folded his arms. "Hereford," he said, "one more simple question. The Peace movement recognizes no need for violence in any form, and no conceivable exception to that idea." It sounded like a recording of the same words, said a few minutes before, except for his carefully controlled breathing.

Hereford touched his bruised mouth. "Yes."

"Then," Belter grinned, "why did you hit me?"

"Why? Why did you hit *me?*"

"I didn't ask you that. Please keep it simple. Why did you hit me?"

"It was . . . I don't know. It happened. It was the only way to make you stop."

Belter grinned. Hereford stumbled on. "I see what you're doing. You're trying to make some parallel between the Invader and your attack on me. But you attacked me unexpectedly, apparently without reason—"

Belter grinned more widely.

Hereford was frankly floundering now. "But I . . . I had to strike you, or I . . . I—"

"Hereford," said Belter gently, "shall we go back now, and vote, before that eye of yours blackens?"

The three Death ships, each with its cover of destroyer escorts, slipped into the Asteroid Belt. *Delta,* the keying unit, was flanked on each side by the opposed twins *Epsilon* and *Sigma,* which maintained a rough thousand-mile separation from the key. Behind them, on Earth, they had left a froth of controversy. Editorial comment on the air and in print, both on facsimile and the distributed press, was pulling and hauling on the age-old question of the actions of duly elected administrators. We are the people. We choose these men to represent us. What must we do when their actions run contrary to our interest?

And—do they run contrary? How much change can there be in a man's attitude, and in the man himself, between the time he is elected and the time he votes on a vital measure? Can we hark back to our original judgment of the man and trust his action as we trusted him at election time?

And again—the old bugaboo of security. When a legislative body makes a decision on a military matter, there must be news restrictions. The Death was the supreme weapon. Despite the will of the majority, there were still those who wanted it for their own purposes; people who felt it had not been used enough in the war; others who felt it should be kept assembled and ready, as the teeth in a dictatorial peace. As of old, the mass of the people had to curb its speech and sometimes its thought, to protect itself against the megalomaniac minorities.

But there was one man who suffered. Elsewhere was anger and intellectual discourse, ethical delvings and even fear. But in one man, supremely, existed the struggle between ethics and expediency. Hereford alone had the power to undo his own work. His following would believe and accept when he asked them to make this exception. Having made it, they would follow no more, and there was no place for him on Earth.

His speech had been simple, delivered without a single flickering of his torture on the fine old face. Once the thing was done, he left Earth in a way foreign to everything he had ever believed, or spoken, or recommended. He, the leader of Peace Amalgamated, who regarded with insistent disfavor the very existence of weapons, left Earth with Belter, and shared the officer's quarters of a warship. Not only was it a warship, but it was the keying unit

Delta, under the command of "Butcher" Osgood, trigger man of The Death.

For months they tracked the Invader, using their own instruments and information relayed to them by various outposts. Under no circumstances did they use tracers. One observation post and seven warships had been crushed because of that. The Invader's reaction to a tight beam was instant and terrible. Therefore, they were limited to light reflection—what there was of it, even from the bold, bright flanks of the marauder—and the detection of the four types of drive radiations used by the ship at different accelerations.

The body of descriptive matter on the Invader increased, and there were certain irrefutable conclusions. The crew of the Invader were colloidal life, like all known life, and would be subject to The Death. This was deduced by the fact that the ship was enclosed, pressurized and contained an atmosphere of some sort, which precluded the theoretically suggested "energy" and "crystalline" life-forms. The random nature of the enemy's vicious and casual attacks caused more controversy than almost any other factor; but as time went on, it became obvious that what the ship was doing was calling forth any attack of which the System might be capable. It had been bombed, rayed, and attempts had been made to ram. It was impervious. How long would it stay? When would its commanders conclude that they had seen the worst, and laughing go back into the depths to bring reinforcements? And was there anything—anything at all—besides The Death that could reach the Invader, or stop him, or destroy him, or even let him know fear?

Right up until D-day—Death-day—the billions who had followed Hereford hoped that some alternative could be found, so that at least their earlier resolutions would be followed in letter if not in spirit. Many of them worked like slaves to this end, and that was the greatest anomaly of all, for all the forces of Peace were engaged in devising deadly methods and engines for use as alternatives to The Death. They failed. Of course they failed.

There came a day when they had to strike. The Invader had all but vanished into the celestial north, only to come hurtling back in a great curve which would pass through the plane of the ecliptic just beyond the orbit of Jupiter. The Invader's trajectory was predictable despite his almost unbelievable maneuverability—even for him there were limits of checking and turning, which was another fact indicating colloidal life. There was no way of knowing whether he was coming back to harass the planets, or whether he was making one last observation before swinging through the System and away from Sol, back to the unknown hell which had spawned him. But whether it was attack or withdrawal, he had to be smashed. There might never be another chance.

The three Death ships moved out from the Belt, where they had lain quiet amongst the other masses

floating in that great ring of detritus. Still keeping their formation, they blasted away with a crushing acceleration, their crews dopey with *momentomine*. Their courses were set to intersect that of the Invader, or close enough to bring them well within range of The Death—twelve to twenty thousand miles. Delicate, beamless scanners checked the enemy's course moment by moment, making automatic corrections and maintaining the formation of the three ships.

Delta was Earth-manned, *Epsilon* a Martian ship, and *Sigma* belonged to the Colonials. Originally, the plan had been to scatter Colonials through the three ships, and use a Jovian craft. But Leess, as the Jovian representative, had vetoed any Jovian participation, an action which had brought about a violent reawakening of antipathies toward the major planet. Public feeling was so loaded against the use of The Death that the responsibility must be shared. Jupiter's stubborn and suicidal refusal to share it was inflexible; the Jovian delegate's feelings were hurt, and Jovian solidarity was as thorough as ever.

Four days out, the master controls dropped the acceleration to 1 G, and the air conditioners blasted out enough suproxygen to counteract the acceleration drug. Personnel came to full life again, and the command gathered on the bridge of *Delta*. Hereford was there too, standing well back, his face misleadingly calm, his eyes flicking from the forward screen to the tactical chart, from Belter's absorbed face to the undershot countenance of Commander Osgood.

Osgood looked over his shoulder at the Peace leader. His voice was gravel in a wire sieve as he said: "I still don't like that guy hanging around here. You sure he won't be better off in his quarters?"

"We've been over that," said Belter tiredly. "Commander, maybe I'm out of order, but would it be too much trouble for you to speak directly to him once in a while?"

"I am satisfied," smiled Hereford. "I quite understand his attitude. I have little to say to him, and much to say about him, which is essentially his position as far as I am concerned. It is no more remarkable that he is unfamiliar with politeness than that I should be ignorant of spatial ballistics."

Belter grinned. "O.K., O.K.—don't mind me. I'm just a poor military man trying to make peace. I'll shut up and let you and the Butcher have your inimical *status quo*."

"I'll need a little quiet here for a while, if it's all the same to you, Councilman," said Osgood. He was watching the tactical chart. The red spot representing *Epsilon* was at the far right, the blue of *Sigma* at the left, and down at the bottom was *Delta's* green spark. A golden bar in the center of the chart showed the area on the ecliptical plane at which the Invader could be expected to pass through, and just above it was a white spot showing the Invader himself.

Osgood touched a toggle which

added a diagram to the chart—a positioning diagram showing the placement of the three Death ships in relation to the target. *Sigma* and *Epsilon* were exactly in the centers of their white positioning circles; *Delta* was at the lower edge of the third circle. Osgood made a slight adjustment in the drive circuit.

"Positioning is everything," Belter explained to Hereford. "The Death field is a resultant -a violent node of vibrations centering on the contiguous focal points of the opposed fields from *Sigma* and *Epsilon*. The beam from *Delta*—that's us—kicks it off. There's an enormous stress set up at that focal point, and our beam tears into it. The vibration changes frequency at random and with violence. It has been said that the fabric of space itself vibrates. That's learned nonsense. But fluids do, and gases, of course, and colloids worst of all."

"What would happen if the positions were not taken exactly?"

"Nothing. The two focal points of the concentrated fields from *Epsilon* and *Sigma* would not coincide, and *Delta's* beam would be useless. And it *might* have the unhappy result of calling the Invader down on us. Not right away—he's going too fast at right angles to our course—but I'm not crazy about the idea of being hunted down by that executioner."

Hereford listened gravely, watching Osgood, watching the chart. "Just how great is the danger of The Death's spreading like ripples in a pool—out in every direction from the node?"

"Very little, the way it's set up. The node moves outward away from our three ships—again a resultant, strictly according to the parallelogram of force. How long it lasts, how intense it gets, how far it will go—we never know. It changes with what it encounters. Mass intensifies it and slows it down. Energy of almost any kind accelerates and gradually seems to dissipate it. And it varies for other reasons we don't understand yet. Setting it up is a very complicated business, as you have seen. We don't dare kick it off in such a way that it might encounter any of the planets, if it should happen to last long enough. We have to clear space between us and Outside of all shipping."

Hereford shook his head slowly. "The final separation between death and destruction," he mused. "In ancient times, armies met on battle fields and used death alone to determine the winner. Then, gradually, destruction became the most important factor—how much of the enemy's materiel could you destroy? And then, with the Atomic Wars, and the Dust, death alone became the end of combat again. Now it has come full circle, and we have found a way to kill, to punish and torture, to dissolve, slowly and insistently, colloidal cells, and still leave machines unharmed. This surpasses the barbarism of jellied gasoline. It takes longer, and—"

"It's complete," Belter finished.

"Stations!"

Osgood's voice sliced raggedly through the quiet bridge. The

screen-studded bulkhead beside him winked and flickered with acknowledgments, as tacticians, technicians, astrogators, ballistics men, and crewmen reported in. All three ships were represented, and a master screen collected and summarized the information, automatically framing the laggards' screen with luminous red. There was little of the red showing, and in seconds it disappeared. Osgood stepped back, glanced at the master screen and then at the chart. On it, the ship symbols were centered in their tactical circles.

The commander turned away and for the first time in these weary months he spoke directly to Hereford: "Would you like the honor of triggering?"

Hereford's nostrils dilated, but his voice was controlled. He put his hands behind his back. "Thank you, no."

"I thought not," said the Butcher, and there was a world of insult in his scraping voice.

Before him was a triangular housing from which projected three small levers with round grips. One was red, one blue. The third was set between and in front of the others, and was green. He pulled the two nearest him. Immediately a red line appeared on the chart, running from *Epsilon's* symbol to the golden patch, and a blue line raced out from *Sigma* to meet it. Just above the gold hovered the white spot representing the Invader. Osgood watched it narrowly as it dipped toward the gold and the junction of the red and blue lines. He rested his hand on the green lever, made one last brief check of the screens, and snatched it back. Obediently, a thin, bright green line appeared on the chart. A purple haze clouded the gold.

"That's it!" breathed Belter. "The purple, there—The Death!"

Hereford, shaking, leaned back against the bulkhead. He folded his arms, holding tightly to his elbows, obviously trying to get a grip on much more.

"Scan him!" spat Osgood. "This I've got to see!"

Belter leapt forward. "Commander! You don't . . . you *can't* beam him! Remember what happened at Outpost?"

Osgood swore. "We've got so much stuff between here and there already that a scanning beam isn't going to make that much difference. He's done, anyway!" he added exultantly.

The large scanning screen flicked into colors which swirled and fused into the sharp image of the Invader. Since the beam tracked him exactly, there was no sign of motion. "Get me a diagrammatic!" bellowed Osgood. His small eyes were wide, his cheeks puffed out, his lips wet.

The lower quarter of the screen faded, went black, then suddenly bore a reduced image of the Invader. Apparently creeping toward him was a faint, ever-brightening purple mist.

"Right on the nose!" gritted Belter. "He's sailing right into it!"

Startlingly, the large actual image showed signs of life. A stream of

blue-white fire poured out of the ship's side.

"What do you know!" whistled Osgood. "He's got jets after all! He knows there's something ahead of him, doesn't know what it is, and is going to duck it if he has to smear his crew all up and down the bulkheads!"

"Look!" cried Belter, pointing at the chart. "Why, he's pulling into a curve that . . . that—Man, oh man, he's killing off all hands! He can't turn like that!"

"Maybe he wants to get it over with quickly. Maybe he's run into The Death somewhere before," crowed Osgood. "Afraid to face it. Hey, Belter, the inside of that ship's going to be a pretty sight. The Death'll make jelly of 'em, and that high-G turn'll lay the jelly like paint out of an airbrush!"

"Ex . . . ex—" was as much as Hereford could say as he turned and tottered out. Belter took a step after him, hesitated, and then went back to stand before the chart.

Purple and gold and white, red and green and blue coruscated together. Slowly, then, the white spot moved toward the edge of the puddle of color.

"Commander! He's still side-jetting!"

"Why not?" said the Butcher gleefully. "That's the way his controls were set when his command got emulsified. He'll blow off his fuel in a while, and we can board him."

There was a soft click from the master communications screen and a face appeared on it. *"Epsilon,"* the man said.

"Good work, Hoster," said Osgood, rubbing his hands.

"Thank you, sir," said the captain of the Martian vessel. "Commander, my astrogators report an extrapolation of the derelict's change of course. If he keeps jetting, he's going to come mighty close."

"Watch him then," said Osgood. "If he comes too close, get out of his way. I'll stake my shoulderboards on your safety." He laughed. "He's a dead duck. You'll be able to clear him. I don't care if it's only by fifty meters."

The Martian saluted. Osgood checked him before he could fade. "Hoster!"

"Yes sir."

"I know you Martians. Trigger happy. Whatever happens, Hoster, you are not to bomb or ray that derelict. Understand?"

"Roger, sir," said the Martian stiffly, and faded.

"Those Martians," said Osgood. "Bloodthirsty bunch."

Belter said: "Commander, sometimes I understand how Hereford feels about you."

"I'll take that as a compliment," said the Butcher.

They spent the next two hours watching the tactical chart. The Death generators had long ago been cut out, and The Death itself showed on the chart as a dwindling purple stain, headed straight Outside and already fading. But the derelict was still blasting from its side jets, and

coming about in an impossible curve. The Martian astrogators had been uncomfortably right, and Captain Hoster had been instructed to take evasive action.

Closer and closer came the white spot to the red one that was *Epsilon*. Viewers were clamped on both ships; the Martian had begun to decelerate powerfully to get out of that ratiocinated curve.

"Doesn't look so good," said Belter, after a careful study of the derelict's trajectory.

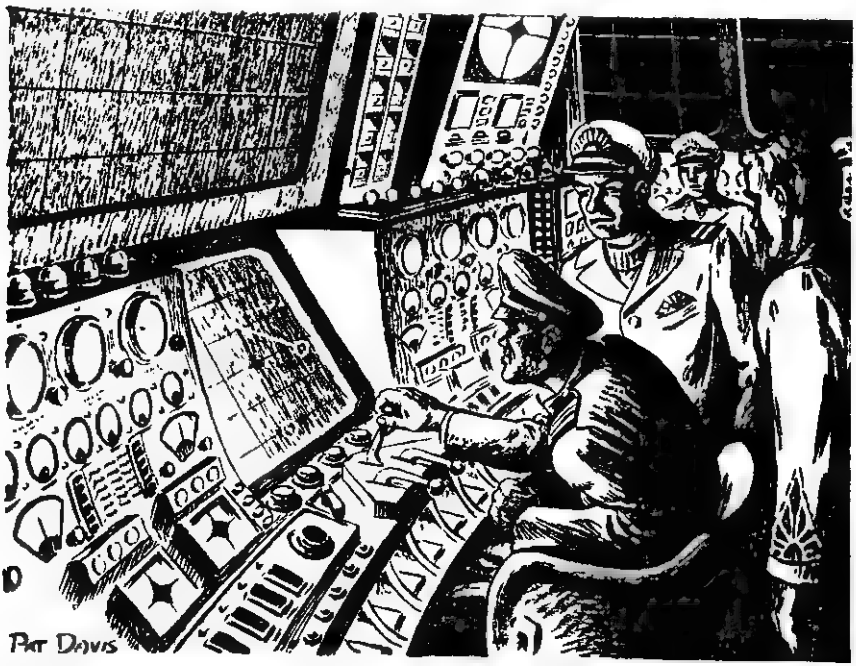
"Nonsense," said Osgood worriedly. "But it'd be more than a little silly to lose a ship after we've whipped the enemy." He turned to the control bulkhead. "Get me *Epsilon*."

He had started his famous monotone of profanity before the screen finally lit up. Hoster's face was flushed—blotched, really. "What's the matter?" snapped Osgood. "You take your own sweet time answering. Why haven't you taken any *momentomine?*"

Captain Hoster clutched the rim of his communicator. "Lissen," he said thickly. "'Nvader out t' get us, see. Nobody push Martian around. 'S dirty Jovian trick."

"Acceleration disease," said Belter quietly. "He must've had some crazy idea of keeping away from the drug so he'd be able to keep on the alert."

"Hoster! You're hopped up. You can't take *momentomine* for as many years as you have and stay sober under deceleration without it.



You're relieved. Take a dose and turn in. Put your second on."

"Lissen, Butch, ol' horse," mouthed the Martian. "I know what I'm doin', see? I don't want trouble with *you*. Busy, see? Now, you jus' handle your boat an' I'll handle mine. I'm gonna give that Jovian a case of Titanitis 'f 'e gets wise with me." And the screen went blank.

"Hoster!" the commander roared. "Sparks! Put that maniac on again!"

A speaker answered promptly: "Sorry, sir. Can't raise him."

In helpless fury Osgood turned to Belter. "If he so much as throws a dirty look at that derelict, I'll beak him to an ammo passer and put him on the sun side of Mercury. We *need* that derelict!"

"What for?" asked Belter, and then wondered why he had asked, for he knew the answer. Hereford's influence, probably. It would be Hereford's question, if he were still here.

"Four drives we don't know anything about. A warp-camouflaged disrupter bomb. A chain-instigating ray, that blew up the asteroid last year. And probably lots more. Man, that's a *war*ship!"

"It sure is," said Belter. "It certainly is." *Peace Amalgamated,* he thought. *A great step forward.*

"Get 'em both on a screen," Osgood rapped. "They're close enough —Hey, Belter, look at the way that ship is designed. See how it can check and turn that way?"

"No, I—Oh! I see what you mean. Uses lateral jets—but what laterals!"

"Functional stuff," said Osgood. "We could've had that a hundred years ago, but for naval tradition. We put all our drive back aft. We get a good in-line thrust, sure. But look what he's got! The equivalent of ten or twelve of our stern-tube assemblies. What kind of people were they, that could stand that kind of thing?"

Belter shook his head. "If they built it that way, they could stand it." He looked thoughtfully up at the derelict's trajectory. "Commander, you don't suppose—"

Apparently struck by the same awful thought, Osgood said uneasily, "Certainly not. The Death. They went through The Death."

"Yes," said Belter. He sounded relieved, but he did not feel relieved. He watched the screen, and then clutched Osgood's arm.

Osgood swore and sprang to the control bulkhead. "Get *Epsilon!* Tell him to cease fire and then report to me! Blast the hub-forted fun of a plistener! I'll pry him loose from his—"

Belter grunted and threw his arm over his eyes as the screen blazed. The automatic shields went up, and when he could see again, the screen showed him the Invader. *Epsilon* wasn't there af all.

After the excitement had died down a little, Osgood slumped into a chair. "I wish we'd had a Jovian ship out there instead," he rasped. "I don't care what they did to us during the war, or anything else.

They could obey orders. When they say they'll do a thing, you can bet on it. What's the score on that business of the Jovians' electing themselves out, anyhow?"

Belter told him how the Jovian delegate had been insulted at the Council.

"Those hot-headed, irresponsible Martians!" said the Butcher. "Why in time did that drunken cretin have to fire on the derelict?"

"What derelict?" Belter asked dryly.

Osgood stared at him. Belter pointed at the chart. The white spot was slowly swinging toward the green—toward *Delta*. On the screen, the Invader still gleamed. It was not blasting any more.

One of the technician's screens flashed. "Detection reporting, sir."

"Report."

"Invader's Type Two drive radiation showing strong, sir."

"R-Roger."

The screen winked out. Commander Osgood opened his mouth, held it open silently for an unbearably long moment, and then carefully closed it again. Belter bit the insides of his cheeks to keep from roaring with hysterical laughter. He knew that the Butcher was trying to swear, and that he had met a situation for which no swearing would be adequate. He had shot his vituperative bolt. Finally, weakly, he said the worst thing he could think of—a thing that until then had been unthinkable.

He said: "They're not dead."

Belter did not feel like laughing any more. He said: "They went through The Death, and they're not dead."

"There is no defense against The Death," said the commander authoritatively. Belter nodded.

One of the screens flashed, and a voice said impersonally: "Mathematics."

"Go on," said the Butcher.

"The derelict's course will intersect ours, sir, unless—"

"Don't say 'derelict,'" whispered Osgood. "Say 'Invader.'" He lay back and, closing his eyes, swabbed his face with a tissue. Then the muscles in his jaw clenched and he rose and stood erect before the control bulkhead, pulling the wrinkles out of his tunic. "Batteries. Train around to the Invader. Tech! Put the batteries on auto. Everything—torpedoes, rays, artillery. Now give me all hands. All hands! Prepare to abandon ship. *Delta* will engage the enemy on automatics. Lifecraft to scatter. Take your direction from your launching port and maintain it until you observe some decisive action between *Delta* and the Invader. Fill up with *momentomine* and give your craft everything they can take. Over." He swung to Belter.

"Councilman! Don't argue with me. What I want to do is stay here and fight. What I *will* do is abandon ship with the rest of you. My only reason is so I can have another chance to take a poke at a Martian. Of all the blundering, stupid, childish things for Hoster to do, taking a pot shot at that killer out there was the most—"

Belter very nearly reminded the

commander that Hoster had been instructed to let the "derelict" pass within fifty meters if necessary. He swallowed the comment. It didn't matter, anyway. Hoster and his crew had been good men, and *Epsison* a good ship. All dead now, all smashed, all gone to lengthen the list that had started on Outpost.

"You know your abandon-ship station, don't you, Belter? Go to your quarters and haul out that white-livered old pantywaist and take him with you. I'll join you as soon as everyone else is off the ship. Jump!"

Belter jumped. Things were happening too fast for him, and he found it almost pleasant to use someone else's intelligence rather than hunt for his own.

Hereford was sitting on the edge of his bunk. "What's the matter, Belter?"

"Abandon ship!"

"I know that," said the older man patiently. "When they have an 'all hands' call on one of these ships there's no mistaking it. I want to know what's the matter."

"We're under attack. Invader."

"Ah." Hereford was very calm. "It didn't work."

"No," said Belter. "It didn't."

"I'll stay here, I think."

"You'll *what?*"

Hereford shrugged. "What's the use? What do you think will happen to the peaceful philosophy when news gets out that there is a defense against The Death? Even if a thousand or a million Invader ships come, nothing will keep us from fighting each other. I'm—tired."

"Hereford." He waited until the old man lifted his head, met his eyes. "Remember that day in the anteroom? Do we have to go through that again?"

Hereford smiled slowly. "Don't bother, friend. You are going to have trouble enough after you leave. As for me—well, the most useful thing I can be now is a martyr."

Belter went to the bulkhead and pressed into his personal storage. He got his papers and a bottle of viski. "All right," he said, "let's have a quick one before I go." Hereford smiled and accepted. Belter put all the *momentomine* in Hereford's drink, so that when they left the ship he, Belter, passed out cold. From what he heard later he missed quite a show. *Delta* slugged it out with the Invader. She fought until there was nothing but a top turret left, and it kept spitting away at the enemy until a disrupter big enough for half a planet wiped it out. She was a good ship too. The Invader went screaming up into the celestial north again, leaving the terrified *Sigma* alone. Belter regained consciousness in the life craft along with the commander and Hereford. Hereford looked like an illustration in the Old Testament which Belter had seen when he was a child. It was captioned "And Moses Threw Down and Broke the Two Tablets of Stone."

Sigma picked them up. She was a huge old Logistics vessel, twice reconverted—once from the Colo-

nial Trade, once as the negative plant of The Death. She had a main hold in her like a convention hall, and a third of it was still empty in spite of the vast pile plant she carried. Her cargo port was open, and *Delta's* life craft were being warped in and stacked inside, along with what wreckage could be salvaged for study.

The place was a hive. Space-suited crews floated the boats in, handling them with telescoping rods equipped with a magnetic grapple at each end. One end would be placed on the hull of a boat, the other on the deck or bulkhead or on a stanchion: and then by contracting or expanding the rod by means of its self-contained power unit, the boat would be pushed or pulled to its stack.

The boats had completed their rendezvous after two days of signaling and careful jetting. All were accounted for but two, which had probably tangled with débris. The escape of so many was largely due to the fact that there was very little wreckage large enough to do any damage after the last explosion.

Osgood's boat hovered outside until the last, and by the time it was warped in all the others had unloaded and their crews were inboard, getting refreshment and treatment. By the time the little "Blister" had been racked, the cargo port was sealed and the compartment refilled with air. *Sigma's* captain opened the boat's hatch with his own hands, and Osgood crawled out, followed by a dazed Belter and a sullen Hereford.

"Your ship, sir," said the captain of *Sigma,* formally, in the traditional presentation of a ship and its facilities to a superior.

"Yeah. I need one at the moment," said the Butcher wryly. He stretched, looked around. "Get any parts of the Martian?"

"No, sir," said the captain. He was a worried-looking, gangly specimen from the Venusian Dome. His name had so many syllables that only the first three were used. They were Holovik. "And little enough from *Delta,* I'm sorry to say. Wh . . . what happened?"

"You saw it, didn't you? What do you think?"

"It seemed as if the . . . the Invader—"

"I'll say it, if you can't get it out," said Osgood bluntly. "He has a defense against The Death. Isn't that fine?"

"Yes sir." The horizontal lines across Captain Holovik's forehead deepened, and the corners of his mouth turned down. "Fine."

"Don't burst into tears!" snapped the commander. He looked around, taking stock of the salvage. "Get all available techs on that scrap. Find out if any of it is radioactive, and if so how much of what type. What's that?"

"That" was a thirty-foot tapered cylinder with three short mast antennae projecting at right angles to the long axis, near each rounded end.

"I don't know for sure, sir," said Holovik. "I knew that there were . . . ah . . . weapons, new ones.

We don't get information the way we used to during the war—"

"Stop mumbling, man! If that's a secret weapon, it isn't from *Delta*."

Belter put in, "It isn't from *Epsilon* either. I went over the specs of everything aboard all of these vessels."

"Then where did—Oh!" His "Oh!" was echoed by Belter and two junior officers who had overheard the conversation. It was a most respectful sound. Also respectful was the unconscious retreat all hands took to the inboard bulkhead.

Hereford, who had not spoken a word for nearly a day, asked: "What's the matter? What is it?"

"Don't know," breathed Belter. "but I'd like to see it out of here. Way out. It's the Invader's."

"G-get it out of here. *Jump!*"

They piled into the inboard section and sealed the cargo inspection hatch behind them, leaving three spacesuited e. m. and an officer to worry the object tenderly out of the port.

"You're a cretin," Osgood told the captain. "You're a drooling incompetent. Whatever possessed you to bring in an unidentified object?"

"I . . . it was . . . I didn't know," stammered Holovik. Belter marveled at the degree of worriment the man's face could register.

A junior officer with communication pips spoke up. "That was the object which didn't register on the detectors until it was within a mile, sir," he reminded. "I still can't understand it, commander. Our detectors—all of 'em—are sensitive up to fifty thousand at the very least. I'm ready to swear our equipment was in order, and yet we had no sign of this thing until it was right on top of us."

"Somebody in Detection asleep," growled the Butcher.

"Wait, commander." Belter turned toward the young signan. "How was this thing bearing?"

"Right on the ship, sir. An intersection course from down left forrad, as I remember. We deflected it and then brought it about with the short tractors."

"It just appeared out of nowhere, eh?" rasped Osgood. "And so you invited it in."

"There was a good deal of débris in that sector, commander," said Holovik faintly. "We were busy . . . tracers sometimes give resultant indications when they pick up two separated objects simultaneously—"

"Yeah, and then they indicate something where nothing is. They *don't* indicate nothing where there is something. Why, I'll break you to—"

"It seems to me," said Belter, who had been pursuing his own line of reasoning, "that what we have here is mighty similar to what hit Out post. Remember? They put a tracer on it as they saw it leave the Invader. It blanked out. They got no radiation or radar reflection at all. But it came in and wiped out the base."

"The nonexistent, hypothetical

'warper,'" said Hereford, with a wisp of his old smile.

Osgood glanced at him coldly. "If you're trying to tell me that the Invader used a warper to protect himself from The Death, you're showing your ignorance. The Death is a vibration, *not* a radiation. It's a physical effect, not an energy phenomenon."

"Blast The Death!" spat Belter. "Don't you see what we've got here? It's one of their disrupters. Short range—always short range. Don't you see? It *is* a warper, and for some reason it can only carry a limited amount of power. The Invader started popping away at *Delta*, and when she fought back, he let loose with everything he had. This must've been one of his disrupters which was launched while *Delta* was in one piece and arrived after she'd been blasted. Then it went right on seeking, but ran out of fuel before it reached *Sigma*. That's why it suddenly appeared to the detectors."

"Now, that makes sense," said the Butcher, looking at Belter as if he were seeing him for the first time. He creased his lower lip sharply with his thumb and forefinger. "Warp camouflage, eh? H-m-m-m. I wonder if we could get a look at that unit. Maybe we could build something like it and get close enough to that devil to do some good." He turned to the fretful Holovik. "Captain! See if you can get a couple of techs to volunteer to de-fuse that thing. If you can't get volunteers—"

"I'll get them, sir," said Holovik, for the first time looking a little happier. It made him appear wistful instead of mournful.

It was easier to count those not volunteering, once the proposition went out over the intercom. In a few minutes *Sigma* lay off a couple of hundred miles to stand by while a crack squad worked over the drifting bomb. They carried three viewers, and the control bridge of the Death ship was mobbed with experts. Every move was carefully discussed; every possibility was carefully explored before a move was made.

They did it. It was slow, and suspense reached an agonized pitch; but once it was done and could be reviewed, it was unbelievably simple. The warhead was clamped to the main hull of the bomb. The activators were in the head, controlled simply by a couple of rods. The seeking gear, proximity circuits, power source, drive, and what was apparently the camouflage unit were all packed into the hull.

A torch was clamped to the warhead, which was cast adrift. The precious hull was towed a few miles with reaction-pistols and picked up by the ship, which then got clear and rayed the virulent little warhead into shocking, flaring extinction.

In shops and laboratories throughout the System, feverish work was carried on over plans and mock-ups of the alien weapon. One of the first things discovered about it was that the highly theoretical and very popular term "warper" was a misnomer. The camouflage was an ingenious complexity of wiring in con-

centric "skins" in the hull. Each impinging radiation caused the dielectric constant of the hull to change so that it re-radiated that exact frequency, at the same intensity as received, but a hundred and eighty degrees out of phase. The heart of the device was what might have been the thousandth generation descended from a TR tube. It hunted so constantly, and triggered radiations with so little lag, that the device could handle several frequencies almost simultaneously.

What used most of the power was the drive. It involved a magnetic generator and a coil which carried magnetic flux. Induced in this was an extremely intense gravitic field, self-canceling forward and on all sides. The intensified "reverse" gravity pressure was, therefore, at the stern. Maneuvering was accomplished by variations in field strength by inductance-coupling of the magflux coils.

The hull was a totally absorbent black, and the missile was made of an alloy which was transparent to hard radiation.

All information was pooled, and sub-projects were constantly assigned from Science Center. Etherfac transmission was full of last-minute reports on phases of the problem, interspersed with frequent communiqués on the last known position of the Invader. He had indulged in an apparently aimless series of convolutions for several weeks following D-Day, evidently to assess his damage. After that he had maintained a great circular course, parallel in plane to the Solar ecliptic, and the assumption was that he was undergoing repairs and engaging in reconnaissance. Both were certainly indicated, for he must have undergone an incredible strain in that wild curve on D Day. And as before, he was the symbol of terror. If he struck, where would he strike? If not, he would leave. Then, would he be back? Alone, or with a fleet?

Belter's life was a continuous flurry of detail, but he found time to wonder about several things. The Jovians, for example. They had been a great help in the duplication of the camouflage device, particularly in their modification of the fission power plant it carried. The Jovian improvement was a disruption motor using boron, an element which appeared nowhere in the original. It gave vastly more range to the Solarian device. And yet—there was something about the Jovian willingness that was not quite in harmony with their established behavior patterns. The slight which Leess had suffered from the Martian was not, after all, a large thing in itself, but the fact that Leess had led his planet into a policy of nonco-operation made it large. The sudden reversal of this policy since D-Day was more than puzzling. A hundred times Belter shrugged the question off, grunting "Jovians are funny people," and a hundred times it returned to him.

There was another unprecedented worry. The Martian delegate called Belter aside one afternoon and presented it to him. "It's that Hereford," the man said, scratching his

sunburned neck. "He's too quiet. I know he lost a mess of 'face' over his vote on The Death, but he still has a following. More than I like to think about."

"So?"

"Well, when the big day comes, when we send a formation of the new camouflaged boats out there, what's to keep him from opening his trap and making trouble for us?"

"Why should he?"

"You know what the pacifists are after. If we fitted out a bunch of these new gadgets with disrupters and wiped the Invader out, they'd have no kick. They don't want that Death-defense to get back to the System. You know that."

"Hm-m-m. And how would you handle this on Mars?"

The Martian grinned. "Why, I reckon Brother Hereford would have a little accident. Enough to keep him quiet, anyhow—maybe for a little while, maybe for—"

"I thought as much." Belter let himself burn for a luxurious second before replying. "Forget it. Supposing what you say is true—and I don't grant that it is—what else can you think of?"

"Well now, I think it would be a bright idea to send a camouflage force out without consulting the Council. That way, if Hereford is waiting for the psychological moment to blow his mouth off, we'll get what we're after before he knows what's happening. *If* we can keep the lid on it, that is."

Belter shook his head. "Sorry, friend. No can do. We can stretch a point of security and take a military action without informing the people, but there's no loophole in the charter which will let any of us take military action without the knowledge of the Council. Sorry. Anyway, thanks for the tip."

This, like the Jovian matter, was a thing he shrugged off and forgot—five or six times a day. He knew the case-hardened character which lived behind Hereford's dignified mien, and he respected it for what it was and for what it could do.

There was a solution to these problems. He laughed when it occurred to him, smiled when it recurred; but he frowned when he realized that he had already decided. He must have, for he found himself slipping Addison's report into a private drawer of his desk. Addison was the Tech in charge of the local camouflage project. It was top secret and had been delivered, sealed, by an orderly. It invited him to inspect a two-place craft which had been finished and tested, fueled and equipped. The report should have gone to the Agenda.

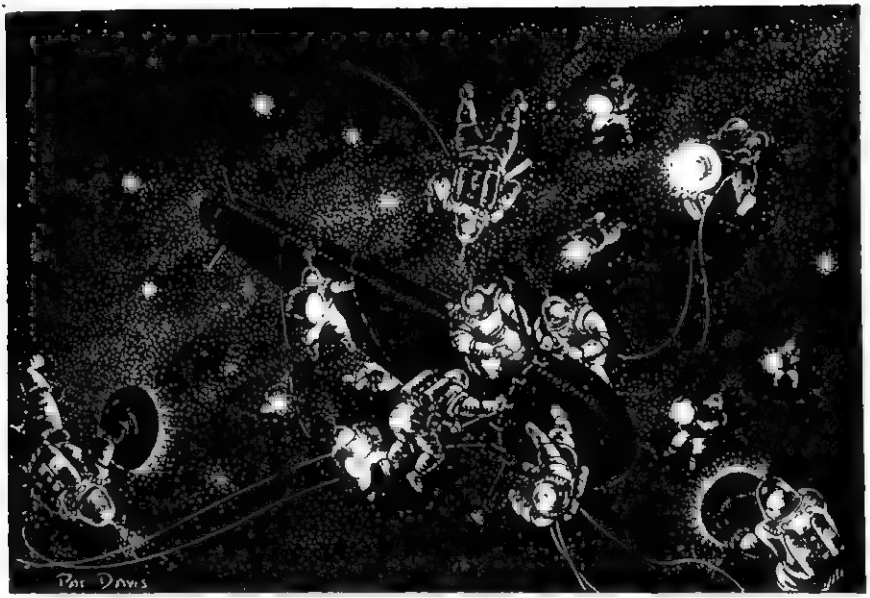
He called Hereford, and when they were alone he asked, without preliminary: "Are you interested in heading off a war?"

"A rhetorical question, certainly."

"Nope. Question two. Have you anything special to do the next few weeks?"

"Why I—nothing out of the ordinary," said Hereford, sadly. Since his historic "Exception" speech, he had had little enough to do.

"Well, clear your social calendar, then. No, I'm not kidding. This is



hot. How soon can you be ready for a little trip?"

Hereford studied him. "In about thirty minutes. I can tell by the way you act that you'd want it that soon."

"You're psychic. Right here, then, in thirty minutes."

Within two hours they were in space, aboard a swift scoutship. Behind him Belter left a bewildered deputy-chairman with a brief authorization in his hands, and an equally astonished Master-Tech, both of whom were sworn to silence. In the scoutship were a sworn-in crew and the black hulk of the camouflaged lifeboat.

For the first two days out he left Hereford to twiddle his thumbs in the cramped recreation room of the ship, while he closeted himself with the skipper to work out an approach course. It took him half of the first day to convince the young man that he was in his right mind and that he wanted to board the Invader—two facts that had been regarded, during the past three years, as mutual incompatibilities.

The approach was plotted to permit the boat to overtake the Invader using a minimum of power. The little craft was to be launched from the scout at high speed on a course which would put it in an elliptical orbit in respect to the sun. This ellipse was at right angles to the plane of the circular course the Invader had been maintaining for the past few weeks. The ellipse intersected this circle in two places, and the launching time was set to synchronize these points of intersection

with the predicted position of the Invader on its own course. The big *if*, naturally, was whether or not the Invader would maintain course and speed. He might. He had, twice before, once for nine months and once for over a year. If Belter watched his tables, and spent enough time with his tetrant and calculex, it would require only an occasional nudge of power to follow his course, or to correct it for any variations of the Invader's predicted position.

After the matter was settled, and he had slept, he rejoined Hereford. The old man was apparently staring right through the open book on his knee, for his eyes were wide and unmoving. Belter slumped down beside him and expelled an expressive breath. "What a way to make a living!"

Amusement quirked the corners of Hereford's mouth. "What?"

"Finding tough ways to die," grinned the chairman. "I'm ready to tell you about this thing, if you want me to."

Hereford closed his book and put it by.

"It's the Jovians, first of all," said Belter, without preliminary. "Those critters think so well, so fast, and so differently that it scares me. It's tough . . . no, it's downright foolish to try to judge their actions on a human basis. However, they pulled one stunt that was so very human that it completely escaped me. If Mars had tried it, I'd have been on to it instantly. It's taken a long time for it to percolate, since it concerns the Jovians. Do you remember how ready they were to help out after D-Day? Why do you suppose that was?"

"I would judge," said Hereford thoughtfully, "that they had awakened to their responsibility as members of the System. The Invader had a defense against the ultimate weapon, the emergency was intensified, and they pitched in to help for the common good."

"That's what I thought, too. Has it occurred to you at all what would probably happen if Jupiter—and only Jupiter—had a defense against The Death?"

"Why, I don't think they would—"

Belter broke in roughly, "Never mind what you would like to believe. What would happen?"

"I see what you mean," said Hereford. His face was white. "We came up from almost certain defeat and won the war when we developed The Death. If Jupiter had a defense, we would be no match for them."

"That's way understated," said Belter.

"But . . . but they signed a peace treaty! They're disarming! They won't break their word!" cried Hereford.

"Of course they won't! If they get their hands on that defense, they'll calmly announce the fact, give us time to prepare, even, and then declare war and wipe us out. There's a great deal of pride involved, of course. I'll venture to say that they'd even help us arm if we'd let them, to make the struggle equal to begin with. They're bugs for that kind of fairness. But the

whole System knows that machine for machine, unit for unit, Jovian for man, there is no equality. They're too much for us. It is only our crazy, ingrained ability to manufacture suicidal weapons which gives us the upper hand. The Jovians are too wise to try to conquer a race which insists on introducing murder-machines without any due regard for their future significance. Remember what Leess said when the Martian insulted him?. 'Barth dead, Jupiter dead, Mars dead. Good.' They know that unless we as a race are let alone, we will certainly find a way to kill off our neighbors, because as a race we don't care if we get killed in the process."

Hereford shuddered. "I'd hate to think you were right. It makes Peace Amalgamated look so very useless, for all its billions of members."

Belter cracked his knuckles. "I'm not trying to tell you that humans are basically rotten, or that they are fated to be what they always have been. Humanity has come very close to extinction at least four times that I know of, through some such kind of mass suicide. But the existence of Peace Amalgamated does indicate that it believes there is a way out, although I can't help thinking that it'll be a long haul to get us 'cured.'"

"Thank you," said Hereford sincerely. "Sometimes I think you might be a more effective peace worker than I can ever hope to be. Tell me—what made you suspect that the Jovians might be after the defense device for themselves?"

"A very recent development. You must know that the one thing which makes our use of the camouflage unit practicable is the new power plant. With it we can run up to the Invader and get inside his detectors, starting from far out of his range. Now, that was a Jovian design. They built it, ergo they had it first.

"In other words, between the time of its invention and the time they turned it over to us, they had the edge on us. That being the case, there would be only one reason why, in their supreme self-confidence, they would turn it over to us: namely, they didn't need that edge any more!"

"It fits," said Hereford sorrowfully.

"Good. Now, knowing Jovians—and learning more every day, by the way—I conclude that they gave us the drive, not because they had something better, but because it had already served its purpose for them. I am convinced that Jovian camouflage boats are on the way to the Invader now—and perhaps they have even . . . but I'd rather not think about that." He spread his arms, dropped them. "Hence our little jaunt. We've got to get there first. If we're not first, we have to do what we can when we get there."

The boat, lightless, undriven, drifted toward the Invader. At this arc of the chosen ellipse, its velocity was low, and suspense was as ubiquitous a thing as the susurrus of the camouflage unit which whispered away back aft. Hereford and Bel-

ter found themselves talking in whispers too, as if their tense voices could carry through those insulated bulkheads, across the dim void to the mysterious crew of the metal murderer which hung before them.

"We're well inside his meteor deflectors," gritted Belter. "I don't know what to think. Are we really going to be able to get to him, or is he playing with us?"

"He doesn't play," said Hereford grimly. "You will excuse the layman's question, but I don't understand how there can be a possibility of his having no detector for just this kind of approach. Since he uses bombs camouflaged the way we are, he must have some defense against them."

"His defense seems to be in the range of his deflectors," answered the chairman. "Those bombs were hunters. That is, they followed the target wherever it moved. The defense would be to stall off the bomb by maneuvering until it ran out of fuel, like the one we picked up. Then his meteor-repellers would take care of it."

"It was obviously the most effective weapon in his arsenal," said Hereford hopefully.

"As far as we know," said Belter from the other end of the emotional spectrum. Then, "I can't stand this. I'm going to try a little drive. I feel as if we'd been hanging here since nuclear power was discovered."

Hereford tensed, then nodded in the dark. The boat was hardly the last word in comfort. The two men could lie prone, or get up to a cramped all-four position. Sitting was possible if the cheekbones were kept between the knees and the occipital bones tight against the overhead. They had been in that prison for more days than they cared to recall.

Belter palmed the drive control and moved it forward. There was no additional sound from the power unit, but the slight accelerative surge was distinctly felt.

"I'm going to circle him. No point being too careful. If he hasn't taken a crack at us by this time, I don't think he's going to." He took the steering lever in his other hand and the boat's nose pulled "up" in relation to the Invader's keel-plane. There was no fear of momentum-damage; the controls would not respond to anything greater than a 5-G turn without a special adjustment.

Within four hours the craft was "over" the alien. The ugly, blind-looking shape, portless and jetless, was infuriating. It went its way completely unheeding, completely confident. Belter had a mad flash-back to a childish romance. She hadn't been a very pretty girl, but to have her near him drove him nearly insane. It was because of her perfect poise, her mask. He did not want her. He wanted only to break that calm, to smash his way into the citadel of her *savoir faire*. He had felt like that, and she was not evil. This ship, now—it was completely so. There was something unalive, implacable, inescapable about this great murderous vessel.

Something clutched his arm. He started violently, bumped his head

on the overhead, his hand closing on the velocity control. The craft checked itself and he bumped his head again on the forward port. He swore more violently than Hereford's grip on his arm called for, and said in irritation: "What?"

"A—hole. A hatch or something. Look."

It was a black shadow on the curve of the gray-shadowed hull. "Yes . . . yes. Shall we—" Belter swallowed and tried again. "Shall we walk into his parlor?"

"Yes. Ah . . . Belter—"

"Hm-m-m?"

"Before we do—you might as well tell me. Why did you want me to come?"

"Because you're a fighting man."

"That's an odd joke."

"It is not. You have had to fight every inch of the way, Hereford."

"Perhaps so. But don't tell me you brought me along for the potential use of my misled pugnacities."

"Not *for* them, friend. Because of them. You want the Invader destroyed, for the good of the System. I want it saved, for the good of the System as I see it. You could achieve your end in one of two ways. You could do it through Peace Amalgamated, back at Central. It would only need a few words to obstruct this whole program. *Or*, you could achieve it yourself, here. I brought you to keep you from speaking to Peace Amalgamated. I think having you here where I can watch you is less of a risk to the procurement of the Death defense."

"You're a calculating devil," said Hereford, his voice registering something between anger and admiration. "And suppose I try to destroy the ship—given, of course, the chance?"

"I'd kill you first," said Belter with utter sincerity.

"Has it occurred to you that I might try the same thing, with the same amount of conviction?"

"It has," Belter replied promptly. "Only you wouldn't do it. You could not be driven to killing. Hereford, you pick the oddest times to indulge in dialectics."

"Not at all," said Hereford good-humoredly. "One likes to know where one stands."

Belter gave himself over to his controls. In the back of his mind was a whirling ball of panic. Suppose the power plant should fail, for example. Or suppose the Invader should send out a questing beam of a frequency which the camouflage unit could not handle. How about the meteor deflector? Would they be crushed if the ship located them and hurled them away with a repeller? He thought with sudden horror of the close-set wiring in the boat. Shorts do happen, and sometimes oxidation and vibration play strange tricks with wiring. *Do something,* his inner voice shouted. *Right or wrong, do something.*

They drifted up to the great silver hull, and the hole seemed to open hungrily to them as they neared it. Belter all but stopped the craft in relation to the ship, and nosed it forward with a view to entering the hatch without touching the sides.

"In the visirecord, didn't the cam-

ouflage disrupter at Outpost show up for a moment on the screen as it left the ship?" Hereford whispered.

"Yeah. So what? Oh! You mean the cam unit was shut off until the bomb was clear of the ship. You have something there, Hereford. Maybe we'd better shut it off before we go in. I can see where it would act like something less than camouflage, enclosed in a metal chamber and re-radiating all the stray stuff in there plus the reflections of its own output." He put his hand out to the camouflage control. "But I'm going to wait until we're practically inside. I don't relish the idea of being flung off like a meteorite."

Handling the controls with infinite care, touching them briefly and swiftly with his fingertips, Belter tooled the boat through the hatch. He switched off the camouflage effect and had the boat fully inboard of the Invader before he realized he was biting his tongue.

Surprisingly, the chamber they entered was illuminated. The light was dim, shadowless, and a sickly green. The overhead and bulkheads themselves, or a coating on them, accounted for the light. There was a large rack on the forward partition containing row on row of the disruption bombs, minus their warheads. Above each ended a monorail device which ran to a track ending in a solid-looking square door—obviously the storage space for the warheads. Another hoist and monorail system connected the hulls themselves with the open hatch. This trackage, and the fact that the chamber was otherwise untenanted, indicated that the bomb assembly, fuse setting, and dispatching were completely automatic.

"Camouflage again," gritted Belter. "This boat is enough like those bombs to fit sort of cozily in one of those racks. In this crazy light no one would notice it."

"This light is probably not crazy to those on board," said Hereford.

"We'll worry about that later. Slip into your suit."

From the after locker they drew the light pressure suits around themselves and secured them. Belter demonstrated the few controls—oxygen, humidity, temperature, magnetism, and gravity, to be quite sure the old man was familiar with them all. "And this is the radio. I think it will be safe to use the receivers. But don't transmit unless it's absolutely necessary. If we stick close together we can talk by conduction—touching our helmets."

It was the work of only a few minutes to grapple the weightless craft into the rack. It was a fair fit. When they had finished, Belter reached in and took out two blasters. He secured the escape hatch and turned to Hereford, handing him one of the guns. Hereford took it, but leaned forward to touch his transparent helmet to Belter's. His voice came through hollowly but clearly.

"What's this for?"

"Morale," said Belter briefly. "You don't have to use it. If we're watched, 'Two armed men' sounds better than 'Two men, one armed.'"

They groped to the inboard par-

tition and followed it cautiously aft. The touch of the metal under his gloves brought a shocking realization to Belter of where he actually was, and for a moment his knees threatened to give way. Deep inside him, his objective self watched, shaking its figment of a head in amazement. Because he had secured a lifeboat equipped for the job, he had come. Because he had gotten inside the Invader's screens, he had approached the ship itself. Because he was close enough and a hatch was open, he had come in. *Just the way I got into the Army, and the way I got into politics,* he grinned.

They found a ladder. It led upward through a diamond-shaped opening in the overhead. The rungs were welded to the bulkhead. They were too narrow and too close together. There were dragging scuff-marks on each side, about eighteen or twenty centimeters on each side of the rungs. What manner of creature ambulated on its centerline, dragging its sides?

A Jovian.

He looked at Hereford, who was pointing at the marks, so he knew that Hereford understood, too. He shrugged and pointed upward, beckoning. They went up, Belter leading.

They found themselves in a corridor, too low to allow them to stand upright. It was triangular in cross-section, with the point down and widened to a narrow catwalk. A wear-plate was set into each side and bore the same smooth scuffs. The deck, what there was of it between the sharply sloping sides, was composed of transverse rods. A creature which could grip with claws and steady itself with the sides of a carapace could move quite freely in such a corridor regardless of gravitic or accelerative effects, within reason.

"Damn!"

Belter jumped as if stabbed. Hereford tottered on his magna-grips and clutched at the slanted bulkhead for support. The single syllable had roared at them from inside their helmets. The effect was such that Belter all but swallowed his tongue. He pointed at himself in the dim green light and shook his head. Hereford weakly followed suit. Neither of them had spoken.

"Lousy Jovians—"

Belter, following a sudden hunch, laid his hand on Hereford's shoulder to suggest that he stay put, and crept back to the bomb bay opening. He lay down, and cautiously put his head over the lip.

A long, impossibly black *something* was edging across the deck down there. Belter squeezed his eyes tightly closed and opened them wide, trying to see through the foggy green radiance. At last he discerned a small figure pulling and hauling at the shadow, the bomb, the . . . the lifeboat.

A human figure. A man. A man who must have come through the Invader's defenses, even as he had. A man with a camouflaged boat.

But no one except a few Techs even knew that the boats had been completed. And the Council, of course.

The man below reached inside his boat and touched a control. It sank down to the deck next to the bomb rack as its magnetic anchors were activated. The man shut the escape hatch and shuffled toward the inboard partition, his blaster in hand, his head turning as he came.

Belter watched him until he discovered the ladder. Then he scrambled to his feet and, as fast as the peculiar footing would allow him, he scurried back to Hereford. His helmet receiver registered an angry gust of breath as the man below saw the short-paced ladder and the scuff-marks.

Belter slammed his helmet against Hereford's. "It's a Martian," he gritted. "You might know it'd be a blasted Martian. Only a Martian'd be stupid enough to try to climb aboard this wagon."

He saw Hereford's eyebrow go up at this, but the peace-man did not make the obvious comment. He was silent as he followed Belter forward to the nearest turn in the corridor. They slipped around it, Belter conning its extension carefully. There was still, incredibly, no sign of life.

Just around the turn there was a triangular door, set flush into the slanted wall. Belter hesitated, then pressed it. It did not yield. He scrabbled frantically over its surface, found no control of any kind. Hereford grasped his arm, checked him, and when Belter stepped back, the old man went to his knees and began feeling around on the catwalk floor. The door slid silently back.

Belter slipped in, glanced around. But for a huddled, unmoving mass of some tattered matter in the corridor, there was nothing in the room, which was small. Belter waved the old man in. Hereford hopped over the sill, felt on the floor again, and the panel slid shut.

"How did you know how to open that door?" he asked when their helmets touched.

"Their feet . . . claws . . . what-have-you . . . are obviously prehensile, or they wouldn't have floors that are nothing more than close-set rungs. Obviously their door handles would be in the floor."

Belter shook his head admiringly. "See what happens when a man thinks for a living?" He turned to the door, set his head against it. Very faintly, he could hear the cautious steps of the Martian. He turned back to Hereford. "I suppose I ought to go out there and pin his ears back. Martians have nothing in their heads but muscles. He'll walk right up to the skipper of this ship if he has to wade through the crew to do it. But I'm mighty interested in just what he's up to. We couldn't be much worse off than we are. Do you suppose we could follow him close enough to keep him out of trouble?"

"There is no need for caution," said Hereford, and his voice, distorted by the helmets, was like a distant tolling bell.

"What do you mean?"

Hereford pointed to the huddled mass in the corner. Belter crossed to it, knelt, and put out a hand. Frozen substance crumbled under his touch in a way which was famil-

iar to him. He shrank back in horror.

"It's—dead," he whispered.

Hereford touched helmets. "What?"

"It's dead," said Belter dully. "It's—homogenized, and frozen."

"I know. Remember the three Jovian capital ships?"

"They couldn't stand The Death," Belter murmured. "They opened all the locks."

He stood up. "Let's go get that fool of a Martian."

They left the room and followed the corridor to its end. There was another ladder there. They climbed it, and at the top Belter paused. "I think we'd better try for the control central. That'll be the first thing he'll go after."

They found it, eventually, before the Martian did, possibly because they were not being as cautious. They must have passed him en route, but such was the maze of corridors and connecting rooms that that was not surprising. They still eschewed the use of their transmitters, since Belter preferred to find out exactly what the Martian was up to.

They had just opened a sliding door at the end of a passageway, and Belter was half through it when he stopped so suddenly that Hereford collided with him.

The room which spread before them was unexpectedly large. The bulkheads were studded with diamond-shaped indicators, and above them and over the ceiling were softly colored murals. They glowed and shimmered, and since they were the first departure from the ubiquitous dim green, their immediate effect was shocking.

In the center of the chamber was a pair of control desks, a V pointing forward and a V pointing aft, forming another of the repeated diamond forms. There was passage space, however, between the two V's. In their enclosure was a creature, crouching over the controls.

It was alive.

It stirred, heaving itself up off the raised portion of the deck on which it lay. It was completely enclosed in a transparent, obviously pressurized garment. As it rose, Belter and Hereford shrank back out of sight. Belter drew his blaster.

But the creature was apparently not aware of them. It turned slowly to face the opposite corner of the room, and the sensory organ on its cephalothorax blushed pink.

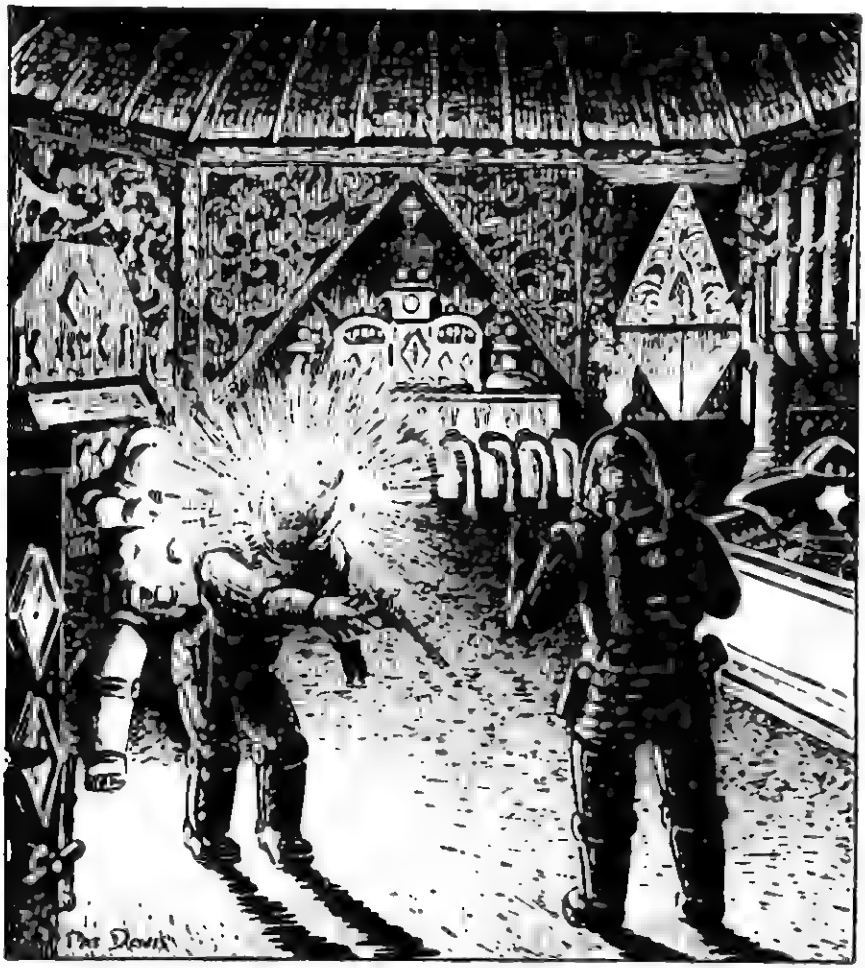
There was a bold clanking from the corner of the room, which Belter felt through his shoes. Then the wall began to glow. A small section of it shone red which paled into white. It bellied momentarily, and then sagged molten. The Martian, blaster in hand, leapt through the opening. *And he could have opened that door,* thought Belter disgustedly. *Why does a Martian always have to do it the hard way?*

The Martian stopped dead when he was clear of the simmering entrance. He visibly recoiled from the sudden apparition of color, and stood awed before those magnificent murals. His gaze dropped to the center of the room.

"So there is a defense," he

snarled. His transmitter was still blatantly operating. "Come on, Jupiter. I was wise to this whole stunt. Who did you think you fooled by poisoning your own forces on Titan? Invader, huh? Some stuff! Get out of there. Move, now! I know you can understand me. I want to see that Death defense and the controls. And there's no sense trying to call your buddies. I've seen them all over the ship. All dead. Something saved you, and I mean to find out what it is."

He raised his blaster. The Jovian quivered. Belter crossed his left arm across his body and grasped the edge of the door. He rested his blaster across his left forearm and squinted down the barrel. Here-



ford reached over his shoulder and drew the muzzle upward.

Belter turned furiously to him, but the old man shook his head and, astonishingly, smiled. His hand went to his belt. He threw his transmitter switch and said in his deep, quiet voice:

"Drop that blaster, son."

The effect on the Martian was absolutely devastating. He went rod stiff, dropping his weapon so quickly that he all but threw it. Then he staggered backward, and they could hear his frightened gasping as he tried to regain his breath.

Belter strode out into the room and backed to the left bulkhead, stopping where he could cover both the Martian and the Jovian. Hereford shuffled over and picked up the blaster.

"P-peace Amalgamated!" puffed the Martian. "What in time are *you* doing here?"

Belter answered. "Keeping you from using your muscles instead of your brains. What do you think you're doing?"

"Recon," said the Martian sullenly.

"For who?"

"What do you think?"

"I think you're doing it for Mars," said Belter bluntly. "It would be just dandy if Mars had the Death defense now, wouldn't it? You guys have been chafing at the bit for a long time."

"We're not crazy," flashed the Martian. "We never did make peace with Jupiter, remember? We knew better. And now look." He gestured at the Jovian. "What a pretty way to knock slices out of all the Solarian defenses. Just play Invader for a few years and scare the bedizens out of humanity. Wipe out what looks tough, and take advantage of the panic. Heh! Treaties with Jupiter! Why in blazes didn't you exterminate them when you had the chance? Now, if Mars gets the Defense, we'll handle the thing right. And maybe when the smoke clears away we'll be magnanimous enough to let Earth and the Colonies work for us."

"All blast and brawn," marveled Belter. "The famous Martian mouth."

"Don't you brag about brains. I know for a fact that our councilman tipped off that camouflage boats were being made in secret. If you didn't act on it, it's your hard luck."

"In a way he did," said Belter. "Enough, I imagine, to keep his little conscience clear. I'm here, for all that."

"Not for long," snapped the Martian, making a long sliding step.

"Look out, Hereford!"

Belter snapped a fine-focus shot at the Martian but he was late. The Martian was behind Hereford, grappling for the blaster which the Peace delegate still held in his hand. Hereford tried to spin away but was unsure of his footing in the gravitic shoes and succeeded only in floundering. The Martian suddenly shifted his attack to the blaster at Hereford's hip. He got it and danced clear. "I know the panty-waist won't shoot," he said, and laughed. "So it's you first, Belter,

and then old 'Peace-in-our-Time.' Then I'll get the Death defense with or without the aid of the spider yonder."

He swung the weapon on Belter, and the chairman knew that this was it. He closed his eyes. The blaster-flash beat on the lids. He felt nothing. He tried to open his eyes again and was astounded to discover that he could. He stood there staring at Hereford, who had just shot the Martian through the head. The man's magnagrips held him upright as the air in his suit whiffed out, to hang in a mist like a frozen soul over his tattered head.

"I killed him, didn't I?" asked Hereford plaintively.

"To keep the peace," said Belter in a shaking voice. He skated over to the old man and took the blaster, which was still held stiffly out toward the dead man. "Killing's a comparative crime, Hereford. You've saved lives."

He went to the control table and put his hands on it, steadying himself against the broken sounds Hereford was making. He stared across the table at the great jelly-and-bone mass that was a Jovian. He would have given a lot for a translator, but such a machine had never yet been made portable.

"You, Jovian. Will you communicate? Spread that membrane for 'yes.' Contract it for 'no.'"

Yes. The creature was perfectly telepathic, but with humans it had to be one way. A translator could convert its emanations into minute electronic impulses and arrange them into idea-patterns for which words were selected.

"Is there anything on this ship which can resist The Death?"

Yes.

"You understand it?"

Yes.

"Will you share your knowledge with the Council?"

Yes.

"Can you de-activate all automatics on this ship?"

In answer the Jovian extended one of its fourth pseudoclaws, and placed it next to a control on the table. It was a small square housing, set so as to repeat the diamond motif. An orange pilot light glowed in its center, and next to it was a toggle. On the forward side of the toggle was an extremely simple symbol—two dots connected by two lines, each two-thirds of the distance between the dots, so that for the middle third they lay parallel, contiguous. On the after side of the toggle, the symbol differed. The dots were the same, but the lines were separated. It was obviously an indication of "open" and "closed" positions. The toggle slanted forward. Belter put his hand on it, looked at the Jovian.

The membrane spread affirmatively. Jovians did not lie. He pulled the toggle back and the pilot went out.

"This General Assembly has been called," Belter said quietly into the mike, "to clear up, once and for all, the matter of the Invader and the contingent wild and conflicting rumors about a defense against The

Death, about interstellar drives, about potential war between members of the Solar Federation, and a number of other fantasies." He spoke carefully, conscious of the transmission of his voice and image to government gatherings on all the worlds, in all the domes, and on ships.

"You know the story of my arrival, with Hereford, aboard the Invader, and the later arrival of the Martian, and his"—Belter cleared his throat—"his accidental death. Let me make it clear right now that there is no evidence that this man was representing the Martian General Government or any part of it. We have concluded that he was acting as an individual, probably because of what might be termed an excess of patriotism.

"Now, as to the presence of the Jovian on the ship—that is a perfectly understandable episode. Jupiter is a defeated nation. I venture to say that any group of us in the same situation would commit acts similar to that of this Jovian. I can say here, too, that there is no evidence of its representing any part of the Jovian Government. What it might have done with, say, a Death defense had it found one aboard is conjecture, and need not enter into this discussion.

"I have before me a transcript of this Jovian's statement. You may rest assured that all facts have been checked; that fatigue and crystalline tests and examinations have been made of metallic samples taken from the vessel; that the half-lives of radioactive by-products in certain fission and disruption machinery have been checked and substantiate this statement. This is the transcript.

" 'For reasons consistent with Jovian philosophy, I took a Jovian-built camouflaged boat and departed with it before the improved drive had been submitted to the Joint Solar Military Council. I approached the Invader cautiously and found the camouflage successful. I boarded him. I put my boat in the Invader's bomb rack, where it was well hidden in plain sight, being the same size and general shape as the Invader's bombs. I went inboard, expecting a great deal of trouble. There was none. Every port and hatch was open to space except the warhead storage, which was naturally no hiding place due to radioactivity. I proceeded to the control chamber. I found the master control to all the ship's armament.

" 'But my most important discovery was a thought record. The Invaders were, like Jovians, of an arthropodal type, and their image patterns were quite understandable after a little concentration. I shall quote from that record:

" '*We are of Sygon, greater of the two planets of Sykor, a star in Symak. The smaller planet, known to us as Gith, is peopled by a mad race, a mistake of nature—a race which fights and kills itself and wars on its neighbor; a race which aspires to conquer purely for the sake of conquest, which hunts for hunting's sake and kills for pleasure. While it progresses, while it co-operates, it bites itself and fights itself and is never done with its viciousness.*

"'Its planet was large enough to support it, but it was not satisfied. Sygon was no place for these vicious animals, for they had to bring their atmosphere in bubbles for breathing, and Sygon's mass crushed them and made them sicken. Not needing Sygon, still they were willing to fight us for it.

"'We killed them by the hundreds of thousands, and still they kept coming. They devised incredible weapons to use against us, and we improved on them and hurled them back. They improved on these, completely ignoring the inevitability of their end.

"'The ultimate weapon was theirs—a terrible thing which emulsified the very cells of our bodies, and there was no defense against it. The first time it was used it killed off most of our race. The rest of us threw all our resources into this, the Eternal Vengeance—this ship. It is designed to attack anything which radiates, as long as the radiations exhibit the characteristics of those produced by intelligent life. It will stay in Sykor's system, and it will attack anything which might be Gith or of Gith. Gith will strike back with its terrible weapon, and all of us on the ship will die. But the ship will go on. Gith will loose its horror and agony on Sygon, and our race will be dead. But the ship will go on. It will attack and attack, and ultimately it will destroy Gith.

"'And if Gith should die and be born again, and evolve a new race, and if that race shall reach a stage of culture approaching that of its cursed forebears, the ship will attack again until it has destroyed them. It will attack all the more powerfully for having rested, for between attacks it will circle Sykor, drinking and storing its energy.

"'Perhaps there will come a time when Sykor will cool, or flare up and explode, or become subject to the influence of a wandering star. Perhaps then the ship will cease to be, but it is possible that it will go wandering off into the dark, never to be active again. But if it should wander into a similar system to that which bore it, then it will bring death and horror to that system's inhabitants. If this should be, it will be unjust; but it will be only an extension of the illimitable evil of Gith.'"

Belter raised his head. "That is what we were up against. What passed in that Jovian's mind when we burst in on it, with our quarreling and our blasters and our death-dealing, I can only imagine. It made no move to harm us, though it was armed. I think that it may have been leaving us to the same inevitable end which overcame Gith. Apparently a Jovian is capable of thinking beyond immediate advantage.

"I have one more thing to tell you. According to star-photographs found in a huge file on the Invader, and the tests and examinations I mentioned, the Invader is slightly over fourteen million years old.

"There is a defense against The Death. You can't kill a dead man. Now, in more ways than one, I give you over to Hereford."

THE END.

The process made a man young again—but it couldn't be used on old men. And it totally destroyed all knowledge and memory. And still it was very valuable indeed!

NEW LIVES FOR OLD

BY WILLIAM BADE

Illustrated by Orban

"O.K.," Kruse said, "mark your seat numbers on your class tickets and bring them up here to me."

Soon there was a line of sophomore college students, both men and women, passing by his desk, each handing him a class ticket and telling him how the name should be pronounced. "Mary Bates . . . Joseph Howard . . . Robert Chadwick . . . John Logan . . ." *John Logan!* Kruse went white and jerked his head up to stare at the erect back of the boy walking down the aisle, and then at the face as he turned and sat down. The boy looked back at him and began to frown perplexedly as he noticed Kruse's attention.

Kruse grew aware of his situation and abstractedly accepted a class card from the girl who was next in the line. Gradually he regained control of himself. But still with half his mind he was thinking of this extraordinary occurrence.

He had never expected that they would meet! Let's see; the boy must be . . . oh . . . nineteen, by now. Nineteen! A grown young man! A grown *son!*

With an effort he forced himself to concentrate on the business at hand. "Louise Stebbins . . . Harold Jakobson . . . Mary Lou Washburn . . ."

When he had added the last card to his pile and the last student had gone back to his seat, Kruse sat there for a moment, trying to organize his thoughts. Before him, on a card, were notes for the brief first lecture he had intended to give. Could he—? Yes!

He cleared his throat: "In this course," he said, "we will study the basic psychological theory of education. Education, that is, taken in a broad sense, including the processes by which preschool age children and also adults learn. Until thirty or forty years ago—"

Ten minutes later he concluded: "The book we will use is 'The Psychologics of Learning: An Introductory Text', by Howard Strong and Alexander Dimitroff." He wrote the title on the blackboard, then turned and said: "Your first assignment is to read the Introduction and Chapter One. That's all for today."

He sat down and watched the class leave the room. With an effort he refrained from staring at his son, whom he could not remember seeing before this day. The identification was almost certain however, involving not only the name but a definite facial similarity to himself. "Not a bad-looking youngster at all," he thought with considerable satisfaction.

The train of circumstances leading to this situation had begun about fifteen years before, in a pleasant little room about ten feet square at Rocky Mountain Mental Hospital. The room had one large, round-cornered window, really a transparent spot in the wall on one side. Is was unopenable, and also unbreakable, as it was made of a material that could not be cut or pierced without the use of power tools. But it did *apparently* give access to the pretty garden and lawns outside, which protected those in the room from claustrophobia. There was a door—a closed door—with a slit of one-way glass at eye level, looking *inward*.

The room held six people. One of them was a plump, nicely-dressed woman, her face set for the moment in an expression of doubt. Two of the remaining five men were dressed in white hospital staff uniforms. Two others wore common street clothes. The fifth, dressed in white pajamas, sat on the edge of a cot and stared at the floor with an unfocused expression, mouth hanging open.

"Well," sighed Julia Logan, the plump lady, "if you don't think you can cure him here—" She turned to one of the men dressed in street clothes. "Why do I have to sign away all my claims on him? Why can't he come back to me after he's cured? I don't trust you people from the Science Centers—."

"Madam," the man said flatly, "the nature of the treatment is such that most of its value would be lost if the patient were to return to his old life. Anyway"—he glanced distastefully at the vacant-faced, pajamaed man on the cot—"he isn't much good to you this way. We're offering to take over his care and make a useful citizen out of him again. If you don't want to take us up, there are plenty of other mental patients in the hospitals of this country."

The woman still hesitated. She went over to the man on the cot, knelt before him. "Ed. Ed. Can you hear me?' she asked plaintively.

The man did not move, but after a second he said, "Yes."

"Dear," the woman pleaded, "Would you mind going away with these men?"

For several seconds the man said nothing, then he began to mumble, "Drops. Drops of rain. Rain drops. Rain drops of rain drops of rain—."

Regretfully the woman stood up. "All right," she said, "I'll let you have him."

All but the mumbling man on the cot left the room. After about fifteen minutes the others came back, the woman wiping an occasional tear from her eye. One of the men in street clothes produced a strait jacket from a small bag and the other helped him get the patient into it. "That isn't at all necessary," Mrs. Logan commented icily. "He is very mild. You don't have to treat him like a wild maniac."

"Lady," one of the men said, "don't try to teach us our business. Catatonics like this have a habit of occasionally cutting loose and raising hell. Have you got any children?"

The woman frowned, then said, "A son. Why?"

"How old?"

"Four years. And why do you want to know?"

The man grunted. "Just give you a little warning. Check any symptoms of introversion, regression." He jerked a thumb at the now safely bound patient. "The tendency to that is hereditary. Come on, Mike."

"Oh!" the woman gasped, halt in dismay, half in indignation. "Doctor, those Science Centers—something should be done about them! They . . . I've heard they're plotting to take over the country and destroy all our democratic rights. What do you think?"

He shrugged. "As far as research is concerned, the Centers are first rate. Always ahead of the rest of the country. Like that new treatment they're going to give your husband. As far as their taking over the country—well, I wouldn't worry about it. After all, how could they?"

"Oh, use their horrible inventions as weapons, I suppose."

"I wouldn't worry. They never get *very* far ahead of the rest of the country in their research. I wouldn't worry."

A passenger copter settled slowly to the field at Kiowa Science Center. The door opened and a man jumped

out and helped someone inside the ship lift a strait jacketed figure out of it. Then the three walked—or rather two of them walked and the one in the strait jacket shuffled between them—into a building and reappeared a minute later in a car that swung onto a broad street and headed down it.

Thus came Edward Logan to Kiowa.

After a short ride the two psychotechnicians hustled him out of the car and into a big, flat, new building. Down corridors they went, and finally came into a room in which a young man sat at a desk with a book of tables and a pile of charts before him. He looked up. "Lethe patient?" he asked.

"Yeah," one of the psychotechnicians with Logan said. "Here's his papers. We got him at Rocky Mountain Mental Hospital. Had a devil of a time getting his wife to sign him over."

The young man at the desk shuffled through the sheaf of papers. "Case history. Wife's consent. Certificate of release from the Head Physician. O.K., boys, I'll take him."

The two psychotechnicians strolled away and the young man took the still heedless Edward Logan in tow and propelled him through a door at the back of the room. One minute later, he was again sitting on the edge of a cot in a cell.

That evening before he left his office to the man on the next shift the young man studied Logan's case history and decided that there was good enough material in him for a psychotechnician, at least. He also left a note to the evening and morning shifts not to give Edward Logan any food as he would be started on Lethe treatment at 9:00 a.m. the next day.

The next morning the young man took Edward Logan out of his cell, along some corridors, and finally into one of a row of little rooms. A waiting biotechnician helped him strip off the patient's clothes and deposit him in a tanklike affair that allowed for the accurate adjustment of temperature, air pressure and composition, and other factors. The young man used a syringe to take a blood sample from Logan. This he then squirted into a sterile bottle and sent it speeding to the laboratory on the second floor via pneumatic tube. While waiting for the analysis report on it to arrive, he checked over the artificial heart, carefully connected it up with Logan's bloodstream, and watching the instruments and the patient for any sign of danger, a capsule containing the analysis report on the blood sample snapped into the end socket of the pneumatic tube. The young man told the biotechnician to keep watch on the patient while he looked over the report.

"Um, let's see," he said. "Physiological aging index 77.2, which checks pretty well with a chronological age of thirty-two years. Blood-group IV, Rh positive. Um. Nothing unusual. Let's go."

He examined the instrument panel on the tank. "Hm-m-m. Weight is one hundred sixty-two pounds. That'll be . . . ah,"—he glanced at a chart—, "fourteen point three milliliters of nutritive solution per hour." The biotechnician adjusted a control knob accordingly.

The young man moved his finger along a curve on another chart and then dropped it to the scale. "And he'll take a first dose of Lethe juice of seven point three milliliters, spread over three hours." The biotechnician twisted another knob and then stood aside to let the young man carefully check over the instruments, the equipment, and the patient. "O.K.," said the young man, "check him over every five minutes or so for the next three hours. If anything seems to be getting out of line, buzz me. I'll be in my office."

"O.K., Doc." The biotechnician followed the young man out of the little room.

Edward Logan lay motionless in the tank. His breathing slowed almost to a stop in compensation for the artificial oxygenation his blood was receiving as it passed through the equipment of the tank. His heart's beating became weaker as the artificial heart took over the load of pumping. Nutritive solution was trickling into his bloodstream to supply the cells of his body with fuel and materials. A series of devices in the tank removed waste products—carbon dioxide, ammonia, uric acid, and so on; in brief, each cell of his body was relieved from working to as great an extent as possible.

Also trickling into Logan's bloodstream was the substance the young man called "Lethe juice," a designation appreciably easier to pronounce than its structure-indicating chemical name. This stuff gradually passed through the walls of capillary vessels and ultimately penetrated into every living cell in Logan's body. The cells thereupon began to change in a manner highly unnormal for cells of a living body. Each one began to lose some of its individuality. About a century before, beginning in 1912, the great pioneer biologist Alexis Carrel had made a bit of chicken-heart famous by keeping a culture of cells from it alive in the laboratories of the Rockefeller Institute for many years. Such cells grown in culture with microbes carefully excluded and waste products carefully eliminated do not age, and do not acquire the individuation that comes in the process of aging. They do however retain their hereditary structure, as muscle cells or gland cells or the like.

The cells that made up Edward Logan were beginning progressively to lose the individuality that they had acquired as he lived and aged. They were beginning to become more and more similar to cells that had been cultivated for several "generations" *in vitro*.

It was not a simple, single change. Each cell changed by itself, and the change was gradual. The cells that were responsible for the com-

position of his blood serum altered so as to increase its growth index. His index of physiological aging began to go down—by means of it progress in the treatment would be measured. The most recent changes that had occurred in his nervous cells—altering the relative resistances of certain synapses and so producing memories and behavior patterns—disappeared. With them disappeared the memories and behavior patterns.

The total effect was to make Logan a younger and younger man. His blood serum became like that of a youth, the memories of his recent life—what there were of them—were obliterated.

At 1:00 p.m. the young man came into the little room again and checked over everything. Satisfied, he took a blood sample and sent it to the laboratory. A few minutes later the report came: Index of physiological aging, 77.1. It had gone down only a tenth in three and a half hours; but because of the greater velocity of fundamental physiological changes in childhood, the progress would accelerate as the treatment went on. The young doctor set the controls to introduce more "Lethe juice" into Logan's bloodstream and left.

So the treatment went on. "Lethe treatment" it was called, because of the utter thoroughness with which all memories were obliterated.

It was a case of Omar Khayyam's "Moving Finger" being called back to cancel out half a book or so.

All memories. Besides mental, psychological memories familiar to everyone, there are physiological ones, uncountable changes that occur in every cell of a man's body as he constantly adapts to the world around him, changes that give rise to his sense of duration. Lethe treatment wiped out even these.

It took time—about twenty-eight days in Logan's case. The process accelerated and became several times more rapid at the end than at the beginning.

The treatment could be stopped at any point, leaving the patient with a more or less complete, if faded, set of memories up to a certain age in his life. It was necessary to bring Logan's physiological age down to about two years, as his tendency to regress had appeared very early, possibly due to an hereditary weakness.

Aside from that, the Centers always carried the Lethe treatment that far for their own reasons.

As the treatment progressed, one by one Logan's physiological defenses, immunities to various diseases for instance, disappeared as the changes in the cells responsible for them were wiped out. Consequently it was necessary that he be protected from bacteria. To this purpose the tank was sealed hermetically and made aseptic, and various substances were introduced into his blood to fight any microorganisms already present.

That technique had taken a lot of working out. It is recorded that Dacus and Fraenkel lost over a hundred dogs before they perfected

it. A dog—or a man—in the late stages of Lethe is almost completely helpless to protect itself from many types of germ. Although the phagocytes are still active, the painfully built-up immunities are all gone.

At the end of the treatment, Logan had the appearance of a freshly-mature young man. But he did *not* look just as he had when he had been twenty-one years old. His body had the same cellular layout that it had had at the beginning of the treatment, but now the individual cells had altered, become younger. Actually his measured index of physiological aging was 11.4.

The young doctor introduced into Logan's bloodstream a substance that combined selectively with the "Lethe juice" in it, stopping the reversed flow of physiological time. Then he added other substances to immunize the patient against common diseases sufficiently that he could live outside the tank. After that he gradually eased off the actions of the artificial heart and the oxygenation apparatus, at the same time increasing the percent of oxygen in the air of the tank.

It took a week to get Logan's body working again to the point where he could function as an independent organism. Then the artificial heart was disconnected and he was removed from the tank.

A couple of psychotechnicians—not the two who had brought him to the Center—came and took Logan on a rolling table to another part of the building. They went into a bright room containing a bed, a table, two chairs, and several equipment closets. The floor was covered with a soft, rubbery material that a man's feet sank into a little as he walked. The psychotechnicians lifted Logan off the rolling table and put him on the floor. One of them pushed the table out of the room and then came back in, closing the door.

Logan lay relaxed where they had put him. One of the two white-clothed men got a hypodermic needle from an equipment closet and drew into it a carefully measured amount of liquid stimulant to counteract the substances that had kept the patient passive throughout the treatment. After he had made the injection he and his comrade sat down and waited. About a minute later Logan began to move his arms and legs, his whole body. He rolled and kicked and flopped around. Finally he opened his eyes.

"You know," said one of the psychotechnicians, "I've handled nearly a dozen Lethe patients, but I still find this stage a little nauseating."

A small child's behavior in a small child is quite normal and perhaps pleasing; in a grown man it is so abnormal as to seem almost obscene.

The other man snorted. "You'd get used to it quick enough if you had to put 'em through the whole second phase, like I do. Well, I guess I can take care of him from here on out. So long!"

"O.K. I'll be seeing you." He got up and left.

The remaining psychotechnician got a book of data sheets and a pencil out of an equipment closet and went to work. Since the first phase of the treatment had stopped when Logan's physiological age was two years, he would be capable of approximately the same activities as a normal two-year-old. But precisely how well could he walk? What was his vocabulary, and how well could he pronounce words? How well could he handle his adult-sized body? The man had to know these and many other things to know just where and how to start Logan's retraining, which would ultimately make a sane, intelligent, capable man of him.

Before long Logan was sitting upright on the floor, staring about with an expression of naive wonderment.

"Ed. Eddie!" the psychotechnician called.

Logan turned to face him. "Yes?" The way he said it the word was somehow queer, hesitating, as if he was unaccustomed to using his vocal equipment.

"Eddie, I'm Joe. I'm your friend. I'm going to take care of you from now on."

"Joe." Logan seemed to think that over. Then, "Where's Mama?"

"She's gone. I'm gonna take care of you from now on." Then, before the patient could object further, the psychotechnician ordered: "Get up and walk over here, Eddie."

Logan got onto his hands and knees and then clambered awkwardly and uncertainly to his feet and tottered bowleggedly across the room to the psychotechnician, who then made a few brief notes in the data book. Logan sat down again with a thump and regarded the situation with a perplexed and distressed expression.

The psychotechnician looked down at him again. "Are you hungry, Eddie?"

"Uh huh!"

"O.K. I'll get you some food." He walked across the room, pulled open the door to an equipment closet, and punched the communicator button for the kitchen. "A light first meal for a second-phase Lethe patient," he said. Half a minute later an opening appeared in a panel and a tray with a dish of food, a glass of milk, and a spoon appeared. The psychotechnician put the tray on the table and then said: "Eddie. Sit down in this chair and eat."

The patient complied, clumsily using the spoon to deposit the food in and about his mouth and dribbling milk off his chin and onto his hairy chest. The psychotechnician made more notes.

When the food was almost all gone, Logan stopped eating and looked doubtfully at the remainder. "I don't feel good," he whimpered.

"Better lie down," the psychotechnician said, and indicated the cot. He was not much disturbed. Most Lethe patients had trouble taking food the first few times after the end of the first phase. Logan did a little better than the average.

He managed to hold down what he had eaten.

When the patient said that he felt a little better, Joe began to quiz him to find out how well he could talk. So far he had given a good account of himself on that point. Now the psychotechnician tested his knowledge of the meanings of a pre-selected list of key words.

After the psychotechnician had finally left, Logan went to sleep on the cot. He didn't realize it, of course, but he had a lot ahead of him. The Centers never, except in occasional experiments, allowed a second-phase Lethe patient to develop haphazardly as many children do, even these days. Instead they put the patient through a rigorous training course that took advantage of his superior adult body and nervous system to develop him as rapidly and fully as possible.

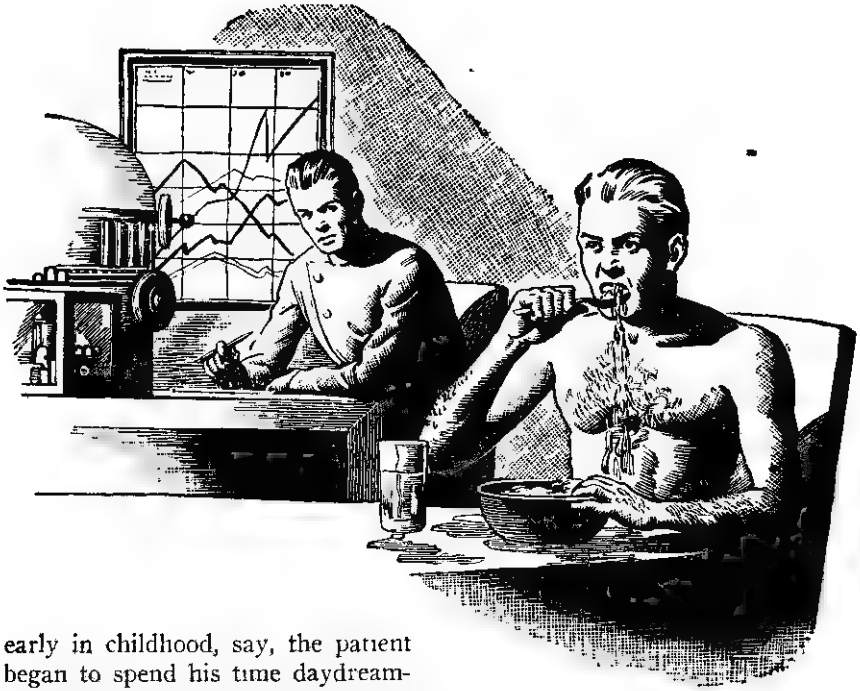
First Logan was trained in the use of his adult body. He was made to practice walking, and later running, jumping, and other athletic activities. He had to practice using his hands to carry out increasingly more complex tasks. His diet was arranged so that he could live on adult food after a few weeks. He learned control and co-ordination. Within a year he was capable of handling his body as well as the average adult.

At the same time he was taught language. More words, and how to use them. Like nearly all Lethe patients he was able to learn amazingly fast at this stage, because he possessed their combination of an adult-sized nervous system and a high rate of flow of physiological time normally found only in very young children.

The psychotechnician Joseph Kruse was his father, mother, and schoolmaster. For friends he had the fifty-odd other second-phase Lethe patients at Kiowa Center and, as he entered upon more advanced studies, many of the brilliant technicians and scientists of the Center.

One of the great, long-term research programs that the Science Centers had worked on from the very beginning was the determination of the conditions for the optimum development of men. At the time Edward Logan was put through Lethe, the psychotechnicians of the Centers were capable of turning a child into a fine, sane, stable adult, provided they had full charge of its development. Because of this, children born and raised in the Centers generally made saner, healthier, more capable adults than those reared in homes outside.

Logan received the full benefit of these new training methods—for they were used on Lethe patients as well as children. The trouble with all the ways that had been tried to cure the functional insanities before A.D. 2000 was that they worked under a terrible handicap. They had to start with damaged, unsuitable material; they had to make individuals who had had unsane mental habits for over half their physiological lifetimes begin to think sanely. Schizophrenia, for instance. Somewhere



early in childhood, say, the patient began to spend his time daydreaming, to refuse facing the problems of life. Then around the age of twenty he cracked up. The doctor had to change the fundamental mental habit of a lifetime, had to start that patient into the habit of facing his problems and solving them. Perhaps he failed; then the patient remained insane. If he succeeded, still—there were marks, distortions left. The patient could never be completely sane, by modern standards. Of course that was also true of the general population of the period.

The great value of Lethe treatment was that it gave the psychotechnician fresh, undamaged human material to work with. The first phase of the treatment along with everything else wiped out the unsane mental habits. The second phase developed the primitive, plastic creature that was left into a sane and intelligent human being.

It was a cure that operated by changing insane personality A into sane personality B—*different!* Thus Edward Logan, one-time office clerk, and more recently a mental patient at Rocky Mountain Mental Hospital became Edward Kruse, highly-trained psychotechnician of Kiowa Science Center. His surname was changed, as was usual with Lethe patients, to break connection with his past. He was a new person—literally!

Five years after emerging from first-phase Lethe, Ed Kruse had

completed the basic training given to all Lethe patients. That meant that he knew enough and had a sufficiently well-disciplined mind to act as a responsible individual in the world of adults. At that time his physiological age was about eight and a half years, so that he was still capable of learning much more rapidly than a normal adult.

Dr. Alexander Dimitroff, one of the venerable founders of Kiowa Center, was lecturing in a friendly sort of way to several student psychotechnicians, Kruse among them. The students were scattered about the office of the aged scientist.

"No matter how you specialize," he was saying, "you'll spend a spell teaching. There are two reasons for that. First, the experience you'll get with people outside the Centers will be invaluable to you later. It'll give you something on which you can hitch all the theory you're going to learn. And second, the existence of a large body of teachers from the Centers in the outside world helps a lot toward the promotion of the Centers' great purpose—to use scientific methods to mold civilization for the advantage of the people in it. Every college student you convince of the value of our science marks progress. Say he gets married and has children. Having studied under you, perhaps he sees that his children get semantic training at least, and get it early when it counts. Or he talks to a friend, gets him to send *his* children to one of our schools. Or maybe he even joins one of the Centers.

"We make progress each time someone studies one of our books or under one of our teachers. But even yet for every person we get properly educated there is another born in this marvelously overpopulated country of ours who will not be. Even yet those fantastic superstitions, the religious, succeed in hampering us. And there are people like this mad Frietz fellow who denounce us and even try to legislate against us. We don't have the rest of the millennium to work in, either! One of these stupid, nationalistic states is apt to start a war if we wait too long.

"Oh! We don't have too easy a time of it! But most of you will have simply to be good students for a few years and good teachers for a few more and then you will specialize and do researches—perhaps! It's a good enough life, all right. But you will never forget that you are of the Centers, and that the Centers have a purpose in existing."

Thus, in the year A.D. 2022 Edward Kruse, formerly Edward Logan, found himself teaching the subject of Educational Psychology to a boy whom he knew to be his own son. Kruse at that time still had the appearance of a well-exercised young man about twenty-one years old, although his actual chronological age was forty-seven years. As a result, there was very little likelihood that John Logan would recognize him as his father.

As soon as he had got home to his apartment that first day of

school, Kruse looked through his locked file of papers to find the duplicate of his case history that he had argued Walters at Kiowa into giving him. Here: First and only child, a son, born 2003. Name, John Edward Logan. How about—? He turned to the inside of the front page where he had glued a copy of the photograph of Edward Logan, age thirty, which had been included in the original case history. He looked into a mirror and compared the two faces. There was considerable resemblance, all right. Like that between older and younger brothers. The face in the photograph was softer, almost flabby. It had a double chin and a ridiculous mustache and there were pouches under the eyes.

His own face—the face he had now—showed the effects of fifteen years of discipline at the Centers. It was lean and assured.

He did not think that John Logan would identify him with the insane father who had disappeared so long ago.

He had already decided that it would complicate the situation needlessly to try to explain matters to the boy. After all, he was probably well adjusted to the present state of affairs by now, and he would probably have no feeling at all for a man he could never remember seeing as his father—especially since the man did not look much older than himself.

Frowning, Kruse began to analyze his own reaction. It was a little strange that seeing the boy had caused such a strong emotional shock, considering that he had no true memory of him as a son. After a few minutes Kruse decided that the reaction was probably linked with his desire to know about his life before the treatment, as shown by his acquisition of this duplicate copy of his own case history. A harmless mental quirk.

Kruse was lecturing one day a few weeks later to his class in Psych. 166, the one of which John Logan was a member. He had just finished a brief dissertation on the system of training children used in the Science Centers when the boy put his hand up.

Kruse nodded at him. "Yes, Mr. Logan?"

The boy stood up and leaned forward, bracing himself by grasping the back of the seat in front of him with his hands. After assuming this belligerant attitude he began to orate truculently: "Mr. Kruse, I would be much happier, and I know that many other members of this class would be much happier, if you would spend more time teaching the material of the course and less time spreading Science Center propaganda. It is bad enough that you forced us to use a propaganda-stuffed Science Center text; but now you must take the class' time to talk *more* propaganda, and that I cannot stand."

He sat down, the class staring at him startled and amused. Kruse also was staring. "This *is* incredible," he thought.

The class was turning to look at him now. "Mr. Logan," he said,

"among a number of facts that you seem to be ignorant of is that the department heads, not the individual instructors, choose the texts for each course. Do you have a class at five o'clock tonight?"

"No."

"Very well, you have an appointment in my office at that hour. Now please leave us to our propaganda."

The class snickered a little. Logan left, stony-faced, and Kruse went back to his lecturing.

At five o'clock Kruse was checking over some papers when the boy came in. He came up and stood beside the desk. "Well, what do you want?" he asked defiantly.

"Sit down," Kruse said, indicating a chair. When he had finished the paper he was working on, he looked up and said, "I am curious as to the real cause of that outburst in class today."

"*Real* cause? Why, just what I said."

"No; what I mean is, why do you hate the Centers?"

"I hate them for the same reason any lover of democracy hates them—they want to destroy our civil rights and run the country themselves. Set up a dictatorship. *You* should know."

"And what makes you think that?"

"It's common knowledge. The Centers have admitted it."

Kruse decided to abandon that line of attack as unfruitful. "What didn't you like about my lecture this morning?" he asked. "It was true, every bit of it, and quite pertinent to the subject. The modern theories of education have never been completely applied except in the Centers."

"Yes, it's true. That's the whole point! The Centers use their psychology to poison the minds of the children raised in them, and then their agents, like you, talk about it as if it were a good thing. You even suggest that we should send our children, if we ever have any, to the schools of the Centers to have *their* minds contaminated with undemocratic, irreligious nonsense."

Kruse was frowning, thinking to himself. Somewhere along the line this boy had been conditioned very strongly against the Centers. Let's see—.

"Ah, Mr. Logan, did your mother hate the Centers the way you do?"

"What business is it of yours?"

"Did she?"

"Well . . . yes." Pause. "They took my dad when I was four. Forced her to sign papers giving him up. Later she tried to reach him, but the Centers blocked her all the way. I can't even remember what he looked like."

"Oh." Kruse sighed. "He was a Lethe patient, huh? Mental patient that they cured with a technique that was rather new at the time, I mean?"

"None of your—."

"Take it easy. I just wanted to say that Lethe patients never remember their former lives, and that they are always given scientific training to fit them for long, happy,

and useful careers. It's better that they never recontact their original surroundings."

"Yeah, it's easy for you to say that. But think—Mom without a husband, me without a father all these years. Anyway, what do you want with me? If you haven't got anything more to say, I've got things to do."

"I see your point. Well . . . I can't have you making any more speeches in class like that one this morning. I'll let you finish the course, and I promise I won't discriminate against you, if you'll behave. How about it?"

"Well . . . all right. In class, I'll keep quiet. That all?"

"Yes."

He turned and swung out the door. Kruse leaned back in his chair and thought. He had a pretty good answer now to the question of why John hated the Centers. His mother, who never had approved of them, had evidently come to hate them actively after her husband's disappearance. She had communicated her hate to John. Now, after fifteen years of such conditioning, re-educating him to a sane point of view would be neither a simple nor an easy task.

In fact Kruse didn't see how he could do it.

One morning about a week later as Kruse was glancing through the school paper he saw the name "John Logan." It was at the end of a letter printed on the editorial page. What the boy had to say was substantially that the Science Centers were a menace to democracy and that their books and teachers should be kept out of the universities. That boy! He seemed intent on making a nuisance of himself.

As Kruse was walking home that night, he met Joe Hokasai, a physics instructor from Kiowa.

"Hi, Ed," he called, "you see that letter by that crazy student in the rag today? Has a Dark-Age mentality and wants to throw us out 'cause we come from a Science Center?"

"Yeah. I saw it. Craziest thing. Joe, he's my son, from before I went through Lethe."

Joe's flat, yellow face slowly broke into an amazed grin.

For reasons best known to himself John Logan made his objections to the Centers less obstreperous shortly after that. Kruse never had him in another class during the two remaining years he instructed at the university. After he had gone back to Kiowa Kruse heard nothing of his son for a number of years. During that period he himself worked his way up into research.

One evening in the autumn of A.D. 2037 Kruse was eating supper with his wife and their three children. After he had mentioned that his work on a theory of telepathy was coming along fine and she had contributed a remark to the effect that her work at the school was going well, the conversation shifted to topics of general interest. By and by she mentioned that a new rabble-rousing opponent to the Centers had risen to take the place

vacated by Jonathan Baker's very timely death.

"What's his name?" Kruse asked, without much interest.

"John Logan."

Kruse looked up. "*Him* again! Huh!"

"What do you mean, 'again'?"

"Oh, he was a trouble-maker at the University while I was teaching there. I had him in a psychology class." Kruse paused uncomfortably, then went on: "The fact is, he's my son by the wife I had before I went through Lethe."

"Oh! What an *odd* situation! Does he know about it?"

"No. I don't see how he could, anyway."

"Oh, well—." She laughed. "Frank Heda told me today that an old man—about eighty—named Elmquist came to the Center with a hundred thousand dollars and wanted to be made young again, with Lethe. He was disgustingly disappointed when they told him that the treatment can't be given after the age of forty or fifty because of cell deterioration."

A few days later, Kruse was sitting in his armchair reading a new book on the mechanisms of insanity when the television set made a snapping noise within itself and came on. He had set it just after supper so that he would not forget to listen to John Logan's latest national speech. He wondered just what the fellow was saying.

Logan, at the age of thirty-four, still had the leanness of his youth. His face was grim and determined. "My friends, the American people," he began, "I have not been the first to expose the iniquities of the Science Centers. The list of those who went before me is a long one. I will mention only the names Reed, Denman, Frietz, and Baker. Martyrs! Four great martyrs!

"Why, martyrs, you ask? Just think back on the death of each of those men and you will know. Each of them died suddenly, of some disease, at the very moment that his agitation was beginning to take effect.

"That is more than a coincidence. I say it plainly—the Science Centers murdered those four men to shut them up. And as soon as they think I am dangerous, they will try to murder me, also.

"To forestall such attempts, I am going to take measures of self-protection. I am doing this not out of cowardice but simply to preserve myself long enough to speak the truth, and to make the job of murdering me so difficult that perhaps the Science Centers will be forced to tip their hand and so destroy themselves.

"You may wonder how death from a 'natural' disease can be murder. The answer to that can be found in hundreds of books published in the Centers. It is well-known that the science of the Centers is mostly biological science Indeed, they boast of it! Listen to this quotation from Gernard Bakke's *'Third Millennium'*: 'One of the great new trends of the last century has been toward the rapid

development of the sciences of Life, and especially the sciences of Man. The Science Centers have grasped this trend and concentrated it and emphasized it until now a new Renaissance may be said to be well underway. Where the old Renaissance saw the birth of the physical sciences, this one is heralding a new world in which Life and Man are the prime entities.'

"The Science Centers excel in biological science. I for one am well convinced that they are capable of using disease as a deadly weapon, and that they have done so already in the cases of the four martyrs, Reed, Denman, Frietz, and Baker.

"I am telling you this, so that if I should suddenly 'happen' to die one of these days, you will know at whom to point the accusing finger—the Science Centers!

"And now I leave you with this thought: If you wouldn't have your children taught by a Nazi, don't send them to a Science Center school, don't let Science Center teachers teach in your city's schools. Nazism and the doctrines of the Centers are about equally antidemocratic. Good night!"

"Yi!" Kruse exclaimed, turning off the set. "That's dynamite! I don't see how he gets away with it, unless . . . yeah, I guess he *must* have somebody big behind him. No private citizen is going on a national network three nights a week. That takes money."

"I wonder if what he said was true—about those four men dying, I mean," said his wife.

"Well, it does sound pretty plausible. Of course there's no telling who would do the rubbing out, if it were done. Some psychotechnician specializing in mass psychologics would run a few graphs and find that the guy is going to start doing some serious damage pretty soon so he'd stroll across the street and get a biotechnician to help him, and Mr. Rabble Rouser would soon be a closed account."

"You know, it's funny," she said, "but in a way that nut is right when he says that the Centers are antidemocratic. It certainly doesn't fit into the old idea of democracy to kill a man just because he disagrees with you as to how things should be done."

"Yeah," Kruse answered, "but there is a difference between mere opinion and scientific truth. We *know* that we can improve the lot of the human race enormously if we're given a chance. When some half-cracked orator who should have had a structural differential stuffed down his throat at an early age comes along and tries to stop us -well, we can't afford to sit around and talk ethics. He has got to be brushed out of the way before he does any serious damage."

"Obviously," she said, "but there are a lot of people who wouldn't understand that."

As the weeks passed and the first snows of winter loomed in the immediate future, John Logan's popularity grew and grew. One evening Kruse watched a big passenger copter unload nearly a dozen

Science Center teachers who had been chased out of several small towns fifty miles to the southeast. They stood there on the field shivering in the sharp, freezing wind and waiting for cars to arrive and pick them up. Kruse watched their faces. They were bitter, resentful. "This must be happening all over the country," he thought. "Why hasn't somebody done something about it?" He took a deep breath and blew it out in a cloud of mist that was whisked away by the wind before it could fade. Then he turned and walked rapidly toward the Psychological Research Building. Five minutes later, as he strode into it, he had an idea of how to proceed.

First, it was evident that by now several attempts *must* have been made to erase John Logan. He was doing too much damage; *somebody* had tried—and failed. It was also evident that before long someone would succeed. The technicians of the Centers had a dozen ways of killing people not known outside, and by now they must be determined to use them all, if necessary.

It suddenly occurred to Kruse that he did not want Logan killed if it could be helped. It was not, he told himself, that Logan was his son. He had other children now, that he loved dearly. It—or was it?

He opened his office door, went in, and sat down at the desk, still slightly shocked at the idea. It was incredible that he still thought of Logan as a son, considering what the man was doing. But the fact remained—he wanted to keep Logan alive because the man *was* his son.

Also, most emphatically, he wanted to have him stopped in his campaign against the Centers.

Well—there was still that idea he had had walking up here. He would have to try it, at least.

He stood up and started collecting papers and equipment. He stopped to dial a number on the videophone and tell his wife to pack a bag for him. He ate supper at home, gave himself an antifatigue shot, and checked out a small jet plane. Just after dark he took off and headed west, climbing to get over the divide. Slightly under five hours later he landed at Turlock Center, the field's great floodlights turned on momentarily to receive him.

He drove directly to the Psychological Research Building and left his stuff in the car as he went in to see whom he could dig up at that hour of the morning.

In the lobby was a student psychotechnician behind a desk, busily studying some lesson. He looked up as Kruse and a gust of icy wind came in.

"Hello, I'm Dr. Edward Kruse of Kiowa Center. Anybody here this time of night? I just got in."

"Well . . . Dr. Hamilton is over in Section D running some tests of some kind. He wouldn't want to be disturbed, though—."

"That's O.K. Can you assign me a small lab and a room with a cot for the time being? I can get started tomorrow morning, I guess."

"Yes, sir. What's that name again?"

The next morning Kruse found some men who had been working on the problem of getting rid of John Logan. Kruse had felt fairly sure that they would be here if anywhere, since this Center was closest to the fortress-home Logan was said to be living in. Carmichael and Hoskins were the mainsprings of the effort to rid the world of Logan, and to them Kruse offered his services and presented his own, nonlethal plan for accomplishing that end.

"It is most fortunate," Kruse said, "that my researches were far enough progressed to allow using them now. Well, what about it, gentlemen? Will you let me take a crack at it?"

"As I see it," Hoskins protested, "there is one serious flaw in your plan. We would have to obtain a close analysis of the structure of Logan's brain in order to focus your . . . ah . . . mental scrambler on it. And to do that we would have to get instruments into the same room as Logan. I tell you that that is quite impossible. The man has himself protected with the utmost thoroughness."

"Wait," Kruse cut in, "I have a way of getting around that. As I told you, when two brains are in close telepathic contact any thought that occurs in one occurs in the other also. I brought along an outfit that's tuned to my brain. I'll get to see Logan, and you can use my brain as a relay station between his and the instruments. It'll work all right. I've done it before, under laboratory conditions."

"About all *that's* likely to accomplish," said Hoskins, "is to end your distinguished career of research. Already we've lost one man trying to get at Logan personally. Now we're getting ready to knock him off at long range using an effect discovered two years ago by Murphy."

"You mean that cell degeneration phenomenon?"

"Yes. We're building the generators now."

"But how are you going to focus it? It would look slightly suspicious to have everyone in the area die suddenly of old age. They'd be howling that we did it right off the bat."

"We can't focus it. And a few unprovable accusations will hurt us a lot less than Logan is doing right now. You don't seem to realize the seriousness of the situation."

"I do realize it. That's why I'm willing to risk my skin trying my plan—which does have the advantage that the means of disposal is a lot less suspicious. Anyway, how about it? All I ask is that you fellows handle my equipment at this end. Just let me try. If I fail, then you can flatten Logan in your own way."

Hoskins and Carmichael looked at each other. "O.K., we'll co-operate," said the former.

Kruse stopped the car in front of the closed, steel gate of Logan's "fortress", got out, and walked up

to the gate, glancing upward momentarily at the arrowhead of fighting planes patroling overhead. A slit opened in the gate at eye level and after a moment a voice said: "What do you want?"

"I want to talk to John Logan."

"Yeah?" There was a nasty chuckle. "Imagine that! On what business?"

"I am his father, and I want to talk to him about the Science Centers."

There was a stunned silence on the other side of the gate. Finally the voice said: "Please wait a minute." Kruse could imagine the guard making hasty phone calls for orders. He had carefully gauged the psychologics of that audacious pronouncement; it should interest Logan enough to gain Kruse admittance.

It did. The gate opened. Kruse stepped inside, and the gate clanged shut again. Kruse smiled at the six men with machine guns and politely lifted his hands into the air. One of them searched him and seemed mildly surprised to find his pockets already empty. He then stepped back and uttered a curt command: "Strip!"

When Kruse's clothes were all on the floor, the man ordered, "This way."

A minute later Kruse had had a blood sample taken from him, had been X-rayed as a whole, and finally had been put into a small cell with gunports in every wall and the ceiling. "It is a good thing," he thought to himself, "that I didn't try to bring any instruments in with me. If I had, I'd probably be dead by now."

There was, he observed, a television camera in one corner, and it was in operation. Doubtless Logan was looking at his image this very instant, speculating as to his purpose.

He was counting on surprise at the visitor being *him*, and a certain factor of personal courage, to insure that Logan would grant a personal interview and not merely talk over an electronic communicator.

Once more his anticipations were borne out. The door of his prison opened and guards signaled him to emerge. They took him into what was clearly a special audience chamber. An armor-plate partition divided it into two parts communicating by a door, which evidently could be closed at an instant's notice by a sliding panel of more armor plate. Logan was sitting where Kruse could see him through the door.

"You will stand where you are," he said, "and do your talking from there."

"You are taking exceedingly elaborate precautions," Kruse said smiling.

"You and I know their necessity. You said that you are my father. Can you prove it?"

"I didn't bring any documents along, and you probably wouldn't have believed them anyway. But you surely can see my resemblance to yourself and to photographs of myself before I went through Lethe."

"Yes," Logan said, "there is a resemblance. And I realize that I am taking a chance letting a Science Center man get this close to me, but you know I'm no coward. What do you want of me?"

Kruse had carefully considered what the text of his speech would have to be. If it were not convincingly sincere he would probably never leave the "fortress" alive. Moreover, he had to be careful to say nothing that could be used against the Centers, as there were almost certainly microphones picking up every word he said and throwing it on wire.

"I came here," said Kruse, "to plead with you. You hate the Science Centers, and you've been doing them a great deal of harm. Yet you evidently care for the people of the United States, and I hoped I could make you understand.

"In one of your speeches you emphasized the fact that the Centers specialize in biological science. You even quoted a section from one of Bakke's books. But you talked as if the sole purpose the Centers had in developing the sciences of life was to use them to commit murder, which even you must know to be untrue. Actually, the great pur-

pose of the Centers has always been to give better lives to a greater number of people. The technological civilization that grew haphazardly from the old Renaissance offered material gains to many people, but only to the great detriment of their development as human beings. Mental diseases and general unsanity were not the only prices the race had to pay for its selfish pleasures.

"The Centers set out to discover the conditions under which men become great men. And they have succeeded to a point. They are transmitting the benefits to the general public by means of their books and teachers and schools. All they want to do is help.

"You are hindering that work, and destroying progress already made. I came here to ask you to listen to reason. You are pushing the whole race back toward the Dark Ages—"

"Do you mean to say that you came here to ask me to stop fighting?"

"With all my heart, I beg you to do that. You have already wrought incalculable damage—"

Now, Kruse thought. *Now!* He made the mental effort that put their minds in contact and at once made his own mind blank. Two seconds was enough for the instruments to get the data. After that time he broke the contact and waited for Logan to speak or show alarm. Even if Kruse were killed now, Hoskins and Carmichael had their weapon to dispose of John Logan.

At last Logan spoke, and it cost Kruse an effort not to collapse from sheer relief as he heard the words: "Throw him out." The armor-plate door clanged and two guards took his arms and led him back to the room where his clothes were. He put them on without much haste and finally went out the opened gate and drove away in his car.

Hoskins was more than a little surprised to see Kruse still alive. Kruse hastened over to his instruments and examined them. They had functioned perfectly! "We've got everything we need now," he said.

"Well, let's hit him, then," Hoskins exclaimed.

"Don't be impatient. It'll do the Centers more good if we wait until he's making his next speech. The psychological effect of that on the masses will be very good, from our point of view."

"You're right," Hoskins admitted.

So it was that several hours later Kruse, Hoskins, and Carmichael were waiting and listening in the laboratory when Logan began his speech.

"My friends, the American people, tonight I am going to expose more of the means by which the Science Centers poison the democratic ideals of our country. I have already told of their schools and teachers—"

"Give it to him," Hoskins growled. Kruse nodded and threw the switch that sent neural currents flowing into the little bit of carefully nurtured brain-matter that had been

"tuned" to John Logan's brain during the afternoon. At once the bit was in telepathic contact with Logan's brain. The haphazard neural currents of the nerve-cell culture blended with the carefully organized thoughts of the orator and produced *-chaos!*

John Logan was still speaking: "The books are full of . . . angleworms . . . and down the . . . son . . . biological . . ." He stopped talking and frowned as if trying to concentrate. Then he was cut off the network and an announcer appeared. "Due to circumstances beyond our control, John Logan's broadcast cannot be continued tonight. We now bring you an interlude of transcribed music." The screen showed an orchestra, which began playing. Kruse turned the set off.

"How long will it last?" Carmichael asked.

"As long as this scrambler stays on. We'll have to have a permanent maintenance man assigned to it. Of course there's a good chance that his mind will be wrecked after, say a year of it. I don't know. That's one experiment I never tried."

"Well," said Carmichael. "I'm glad you came to help us. Your plan certainly worked."

"It hasn't run its course yet," said Kruse.

"How do you mean?"

Kruse told them. He also told them that he was Logan's father. When he was through, Carmichael just looked at him and grinned.

It was a fairly cool summer day in A.D. 2043. A jet plane came scooting in to land on the field at Kiowa Science Center. After it had stopped rolling the door swung down and someone inside pushed a strait-jacketed figure down the steps to the ground. Then a man emerged carrying a black equipment case. A car came rolling up, Edward Kruse at the wheel, and the two arrivals got in, the bound one with assistance.

A few minutes later they all got out and went into a big, flat building that was no longer new. They walked down long corridors and finally came into a room where a young doctor sat at a desk. "Lethe patient?" he asked.

"Yes," Kruse answered. "This is the one I was telling you about —my son, John Logan!"

THE END.

COSMETICS

BY JOHN D. MacDONALD

An interesting proposition on the Importance of Being Ugly.

Illustrated by Napoli

Jason Blood sat in a deep chair in his study and for the dozenth time pressed the button in the chair arm which projected Carol's letter onto the screen opposite him. The first projection had been a considerable shock, but with subsequent projections, in the light of his newly discovered loneliness, he found that he was able to view her animated face with the same contempt, the same amused contempt that he viewed all the others. But there was pain in it too, because she had been his wife for many years.

He stopped listening to the sense of her words and examined the structure of her face. He knew that it was Carol because of the identification medallion on the left side of her tunic. He realized that he was glad that, throughout all of her autocosmetic changes she had retained a delicate bone structure around her eyes, at her temples. Not like some of the others who diverted themselves by frequently shifting to the grotesque, making life a succession of masks—the lovely and the horrible, a spiced cookery of flesh and outlook.

He guessed that probably he had been misled by her conformity to what he liked in her—the tall leanness, the fragility and the wide, clear eyes.

But the letter was a refutation.

The face on the screen looked into his eyes. "I suppose I'm somewhat of a coward, my darling, in telling you this way, but you see if I tried to tell you in person, you'd find some way to get around me.

"Do you remember when we were first married? You had none of these silly scruples about autocosmetics at that time. Our love was freshened by the rhythm of variety. Remember how I'd leave you a note telling you how I wanted you to look? Darling, you were such a wonderful succession of tall, strong men—and I tried so hard to make myself into all the types of beauty that you wanted to possess.

"But now these things which you mysteriously label 'principles' have come between us. You have made no change in four years, and you talk about 'solidification of personality' instead of about what you can do to please me. Jason, darling, I

don't like the form you selected for yourself four years ago. By retaining it, you are not living up to your responsibilities as my husband. I hate that lean, ascetic face, the thinning hair, the knobbed knuckles, the harsh look in your eyes.

"You seem to have lost all gayety. I am constantly making excuses to my friends. They consider you queer and reactionary. Our love needs freshening, my dear, and you refuse to help. I have done all that I can do. You take life too seriously, and you pay too much attention to that horrible Karl Dane and to your interminable discussion with him.

"So I am leaving you, Jason. I have found a man who is something like what you used to be, and I have instructed him on the autosuggestions you used so that he can look as you used to look. I will always pretend that he is actually you, my darling.

"Please forgive me, and when you decide that you have been wrong, I will come back to you."

The vision on the screen faded. Jason Blood stood up and walked over to the wide window that looked across the terraced parks of the city. The bright afternoon sun shone on the couples and groups that strolled aimlessly along the paths. The men were all tall and incredibly handsome. The long-limbed women were the apex of the dream of beauty which had existed through the ages.

He cursed silently and turned away from the window. Where the others saw health and beauty, he saw only an incredible dullness. He smacked his bony fist into his palm. If only he could drop this thing in which he believed. The autocosmeton which Carol had used so frequently stood silently in a far room of the house. A constant temptation. If he could forget what he believed in, if he could subject himself to the machine, put on the disk of identification and then seek out Carol—see the new delight and the love in her eyes—

He heard footsteps approaching, recognized the heavy steps of Karl Dane, and smiled bitterly as he realized how close he had been to giving up what they both believed in.

Karl Dane was a big man with pads of flesh around his small eyes, a mountainous belly and fat, freckled hands. He was an atrocity in a city of beauty.

He scowled at Jason, sat heavily in a chair and said: "Fenner has gone over."

"No!"

"Yes. He got tired of fighting—tired of trying to beat into their thick skulls the fact that they're killing the race. He turned himself into a pretty boy this morning and now he's out roaming the city, beaming foolishly at the rest of them. What's the matter with you?"

"Carol left me this morning," Jason said flatly.

Karl chuckled. "Poor Jason! You thought she was different, didn't you? I knew better. She's like the rest of them. She just stuck around hoping that you'd change, that you'd decide to give up your silly ideas about being a savior of the race."

"I don't want to discuss it."

"Don't get touchy, boy. You and I can't afford to quarrel. We're the only two thinking beings left in the city."

Jason felt his quick irritation slip away. He sat down and said helplessly, "Karl, we're not getting anywhere. I'd like to get a sledge and smash every autocosmeton in the city."

"And they'd kill you with a smile and rebuild them. I tell you, we've got to pick our recruits young and get them to sign a solemn pledge that they will never alter the faces and figures that God gave them. Then we'll begin to get some place."

"But Karl, we can't offer them a thing except a shorter life."

Karl Dane frowned heavily and stared at the wall. "For the last week, Jason, I've been doing research into how it all started. Maybe by backtracking we can find the answer. Let me give you the highlights.

"It started back in the mid-thirties of the last century. Maybe a little before. In 1933 C. L. Hull did some work on suggestibility. In 1938 H. F. Dunbar published a work called 'Emotions and Bodily Changes'—through Columbia University Press. F. A. Pattie did some work in 1941 on Hypnotic Suggestions. All that was the basic groundwork.

"In 1952 L. K. Bagwell published 'Hypnosis for Anaesthesia and Hemorrhage Control, and got a lot of publicity. Then Labot, in 1955, stimulated by Bagwell's work, applied hypnotic suggestion to healing and managed to greatly stimulate the growth of tissue. The early boys showed that by a concentration of the psychic processes, localized peripheral effects could be produced.

"With the drugs that Labot used, he could go far beyond mere peripheral effects—in fact, by a concentration of the psychic processes, he could cause internal tissues to part.

"You can see that all this was heading toward the question of hypnotism versus operative technique. But it wasn't until 1964 that the suggestions to the patient in hypnosis could be adequately controlled. The four phases—anaesthesia, destruction of tissue, hemorrhage control and healing—were already in existence. With the development of better control of suggestibility, good hypnosurgeons began to do simple operations.

"They learned from these operations, and began to do more complex ones. The successes were startling, and manual surgery began to die out. Why weaken the abdominal wall with an incision when the patient himself can be forced to concentrate his psychic processes in such a manner as to destroy his own vermiform appendix and heal the surrounding tissue?

"Everything was just dandy until in 1965 the famous clinical case of a Mrs. R. M. occurred. Now this woman was as ugly as sin—so ugly that the mere fact of her ugliness was a matter of such great importance to her that under hypnosis the question of autosuggestion wasn't entirely wiped out. During a hypno-

tonsilectomy her subconscious shot additional suggestions into the operation so that, after it was over, an outsize nose had been reformed, a low forehead had increased in height and a set of protruding teeth had turned back into a more normal position. Her own husband barely recognized her. She got a big publicity play and every haggard hag in the world started to scream for cosmetic hypnosurgery.

"Between 1965 and 1998 it is estimated that ten thousand cases a year of pure cosmetic surgery were handled. Co-ordinate with this accomplishment, if you want to call it such, were further advances in traumatic hypnosurgery so that all infectious and organic disorders were brought under control. The new era of international health had arrived. They began to work on the age problem, taking the old folks and, in a series of hypnosessions, regenerating the tired tissues and turning them into youngsters. Folks still died of old age, even as they do today, but they died at a hundred and fifty and died looking like next year's debutantes.

"All of the world's billions clamored for attention and the richest men were the hypnotists—and the busiest. They coined money and power and set up lobbies to restrict the number of eager young people going into the field. Amateurs killed a lot of patients in clandestine sessions. They also turned out some monsters and the regularized hypnosurgeons refused to repair the damage, leaving the monsters to roam around loose as a warning to those who wanted to take the chance of being operated on by amateurs. It was a mess.

"In 1998, International Motors came on the market with a crude model of what we know as the autocosmeton. The hypnotists tried to block it and nearly succeeded when a bunch of people gave the machine silly suggestions to read back to them under trance and it very properly killed them. A man named Therbolt invented the controls which today keep any cosmeton from reading back a killing suggestion. The early models worked just like the ones the fools use today. You decide what you want to look like from the booklet and read the code words to the machine. Then you take the receptivity drug, sit in front of it and watch the little rotating flashing gimmick. When you go under, the suggestions, along with the standard control suggestions, come back to you and the concentrated psychic processes do the rest. In the early days you sat in the trance for twenty hours and when you came out of it, the new tissue was still pretty tender, but, as you know, it's only a three-hour job now. Take your pill and wake up with a new face and a new figure to go with it.

"It led to a lot of crime at first until the individual identity disks were made standard and the death penalty was invoked for going without your disk or with the wrong one."

Jason sighed. "That's all very nice and a good job of research, but it misses the point. The thing I'm

interested in, Karl, is the opinions of the rebels."

"Their opinions in the early days weren't any different from ours. And they were just as helpless. I don't know who noticed first that there were no new inventions, no new art, no virile literature. The world gradually switched over to a status quo setup, with all industry only concerned with maintaining the products already distributed. But it was Hanley in 2026 who gave us the reasons. Hanley was the first guy to get notoriety by refusing to change himself. Ugly beast he was, too. His theory was that the best part of the human personality is conditioned by the face we present to the world. Our actions are in part a compensation for this static impression that we give. Thus, in a world where you can have a new face tomorrow and a new figure—provided you get tired of the old one—there was no incentive to force changes on society in compensation for the static impression that you gave to all people. Also he brought in the idea that much of our great art and literature were created by people who were seriously and hopelessly ill—conscious of their illness and striving for some sort of immortality. A subsidiary facet is the idea of increased longevity lessening the consciousness of the shortness of life, which in turn, has resulted in creation.

"We are in an era where the entire ego of the common man—and woman—is built around the idea of eternal change in outward appearance. Thus we have achieved a norm in personality that is deadly. There is no sublimation of dissatisfaction into creative channels. No invention, no art, no creative thought. Just maintenance. That's all. The Age of Maintenance.

"A hundred years ago we thought we could reach the stars. We were well on our way. Atomic drives for space rockets and all the rest. What happened? The sad little men of fifty and sixty who were sweating out the details in labs suddenly discovered that they could be twenty again. A big, lush, brawny twenty with fine muscles and a handsome face. They didn't want to take their beauty back into the lab. So they got maintenance jobs, a few hours a day. The same way with all other fields of endeavor. Makes me sick to my stomach. Where's our tremendous destiny that mankind used to talk about? Solidified. According to them, we've got it. The lines of our cars and boats and houses and aircraft will never change. Just our faces.

"True, war went out with progress. But not for the same reason. Who'd want to become a soldier and take a chance on getting holes in that beautiful face. The soldier could regrow arms and legs that he might lose, but if he was killed it would cut short a hundred and fifty years of wonderful pleasure and admiration of self. Jason, the thing I hate about the world more than anything else is that it's desolately dull. I guess we two are symbols of the past. Maybe we ought to turn pretty and get out and play with the girls—stop thinking, stop brood-

ing, stop trying to put the big silly mass of mankind back on the tracks with full steam ahead."

Jason smiled crookedly at him. "Are you going to emulate Fenner?"

"No. I just like to talk. I *am* worried, though. I've got a hunch my heart is going bad. I'm carrying too much fat around. I might die tomorrow. The instinct of self-preservation tells me to take a few treatments and cut the fat and repair the heart and become pretty—and probably dull like the rest of them. Should I prostitute my ideals for the sake of personal safety?"

Jason felt quick concern. "Karl . . . maybe you ought —"

"Nonsense. I'd rather be dead than bored. Let's get back to the point. What can a couple of vestigial remnants of the past like the two of us do to jiggle mankind out of the rut. You've tried to talk to them, haven't you?"

"Sure. The young ones are the worst. Their education has been so much skimpier. You try to get a simple idea across and they look at you blankly. Then they say, 'Mr. Blood, why don't you take a change? You talk so good that you ought to have the looks to go with it.'"

Karl sighed and stumped heavily to the window. He said, with disdain: "Look at 'em! Strutting like a bunch of prize roosters. They all look alike. Maybe this is the age of Duplication. I've got to get back, Jason. I've talked a young girl into coming around to my place at four. She seems brighter than most and I'm going to see if I can get her interested. Maybe if I can make her mad enough, she'll start thinking."

"Good-by, Karl."

After the heavy man had left, Jason Blood was once again alone with his need of Carol, his thoughts of quiet desperation. To be so alone in a world where they were all so obviously contented, so oblivious to their own plight. He sank back in the chair, a lean, spindly man of less than average height, with the thin inbred face of a dreamer. He had copied the face and figure from an old text, from a picture of one of the world's famous philosophers. That was four years back. He wondered what seed of discontent there was in him which made it impossible for him to conform with the rest.

Through the open window he heard their voices. They laughed. They were very gay. Jason's thoughts were close around him, like a small cloud of gloom in a bright world. A dying world. A world of the status quo.

As he sat, thinking, a tall girl tiptoed to the doorway and looked in at him. Her eyes were soft, but the line of her lips was determined. She was tall, and soft blond hair fell to her shoulders. Her features were regular and perfect. She wore a close-fitting tunic which crossed her breast leaving one shoulder bare. It stopped midway between knee and hip. She wore sandals of gold.

She looked at the back of Jason Blood's head, and then beckoned to someone behind her. He came through the doorway, stepping as quietly as she. He was a tall

Viking, his deep chest bare and symmetric. He looked troubled. He licked his lips and glanced at her. She nodded.

In his right hand he carried a short club made of rubber. He raised it and slammed it heavily against Blood's head, just over the ear. As Blood slumped forward, the tall young man caught him.

He picked him up easily and carried him out of the study, back through the house, Carol walking silently behind him. Tenderly he lowered Blood into a chair placed before a small austere machine.

He whispered: "Is the suggestion all set?"

"I did it this morning," she said.

She took a hypodermic from a drawer of the machine and with deft, practiced gesture, filled it and injected it cleanly into Blood's upper arm. She waited a few moments and then slapped Jason Blood's face smartly. He stirred and moaned. She compressed her lips and slapped him again. He opened his eyes drowsily and looked up at her. His eyes flicked from her face to the identity disk that told him that it was Carol.

"Carol!" he said thickly. "What "

She flicked the switch on the machine and a brilliant light played on a small metal whirligig, like a toy, set in a frame near the top of it. Jason looked at it, and tried to look away, his face twisting with sudden alarm.

"No!" he said loudly. "No!"

But she ran her fingers through his thinning hair, and even as he spoke his eyes became glassy in the intensity of his stare at the whirling toy.

The voice, her voice, came from the machine. Soothing. Calm. Confident. "Jason Blood, you are very sleepy, very sleepy, very sleepy, very sleepy, very—"

Carol took the young man's arm and led him from the room. In the outer hall she said, "Thank you, John."

"It means that I'm losing you, of course. Just when I'd found you. Carol, I wouldn't have done it for anyone else."

"I know that," she said simply. "But it was the only way I could bring him to his senses."

"If it doesn't work, Carol, I'll . . . I'll be waiting." He turned and left quickly. She stood for long moments in the hallway and then returned to the room where the autocosmeton droned quietly. She took a critical look at Jason, and then, feeling slightly ill, walked out of the room. It was very disquieting to look at the work in process. She took a scented shower and climbed into her wide, deep bed. She fell asleep with a small smile curving the corners of her mouth.

Jason Blood came slowly up out of deep sleep, a consciousness of vitality and strength making him yawn and stretch luxuriantly before he opened his eyes. He froze, his arms extended, his narrowed eyes looking at the dark and silent shape of the autocosmeton in front of his chair.

He had guessed, while awaking,

that he had fallen asleep in his study; this was an entirely different part of the house.

What was it? Something about Carol—her fingers touching his hair, the bright revolving toy on the machine — dimly remembered, as something seen in a dream. He slowly lowered his arms, and, glancing down, saw with a touch of horror, that his lean pale arms were longer—thick, bronzed, evenly muscled. They weren't his own hands. Stranger's hands. Solid. Square. Well-formed, with long tapering fingers.

Could Carol have been responsible? Of course! He jumped up so quickly that he knocked the chair over. What a foul trick! Somehow, she had managed to get him out to the autocosmeton. What would Karl say? The strange hand ran over his face, over unfamiliar planes and angles. He remembered that somewhere he had the original suggestion table which he had used four years before. He began to relax. It was simple. Merely give himself a second treatment and return to the familiar face and figure.

He would demand an explanation from Carol. His short tunic was uncomfortably tight. He hurried through the house, found her asleep in the bedroom. He looked down at her placid, sleeping face, feeling the drive of his need for her.

A huge mirror was built into the far wall. He was curious as to what Carol had done to him. He turned toward the mirror and inspected himself. He saw a man in his early twenties, over six feet tall, with enormously broad shoulders, a slim waist and a flat, tight belly. The arms and legs were smoothly and beautifully muscled. He was an even bronze tan. Dark blond hair curled crisply on his head. The face was good, a lean face with a quizzical look about the eyes, a touch of humor in the set of the mouth, slight hollows in the cheeks.

He arched his back and expanded his chest, admiring the play of muscles, the construction of the superb body.

Young again! Alert and vital and full of the pure joy of healthy existence.

Carol stirred, opened her eyes and looked up at him. He saw the quick admiration after she had checked the identity disk pinned to the tunic which was no longer large enough.

"Darling!" she said softly.

He stood there and suddenly Karl Dane became a very distant and silly man who persisted in clinging to the past. This was the present! The eternal present!

Picking her up in his strong new arms, he walked with her to the wide window. Her head was on his shoulder and they looked happily down into the terraced parks of the city where, in the first gray of dusk, the wandering couples and groups made brilliant dots of color against the cool green.

"You've been away so long, my darling," she said gently.

"I'll never leave you again."

THE END.

MAGGIE

BY J. J. COUPLING

The two most important weapons of the recent war were the atomic bomb, and radar—and it was Maggie, the magnetron, that made Allied radar incomparably superior to the Nazi's best. This is the story of Maggie, and the tribulations of the engineers who "made her what she am today."

[Illustrated Cover of the 3rd Telephone Laboratories

The tribe of Maggie the magnetron, the Powerful Katrinka of electron tubes, is earning an honest living in the peacetime world, working in the kitchen. Magnetrons furnish the power to fry frankfurters and broil steaks in the Raytheon Radar Range. Some more glamorous magnetrons still are at work in radar, making peacetime radio location go, and I suppose that bigger and better magnetrons are being made for the Army and Navy. Still, Maggie's glory is a little dimmed. In the days of the war, just before the atom bomb crowded radar out of the news, Maggie was *the* device which we had and the Germans didn't. The centimeter wave radar enabled us to bomb German factories at night or through fog, and to shoot down German planes when they tried to stop us. It brought our pilots safely home through mazes of islands in the Pacific—this was an extra feature, so to speak. However good magnetrons may be in the future, they will never be quite as exciting as they were in the war, before the atom bomb—and when you couldn't tell anyone about them!

A story about magnetrons is bound to be a little like the memoirs of a once famous figure, an account not so thrilling as if it had appeared at the height of the excitement. Still, it should hold its own interest, for now we can look back with mature consideration on the beginning as well as the height of the story, and, to all intents and purposes, we know how it comes out in the end. The story of Maggie seems to be just about complete.

The magnetron was announced quietly in a paper by A. W. Hull of the General Electric Company, published in the *Physical Review* in 1921—twenty-six years ago. Don't

think, however, that mere stupidity kept us from having microwave radar on the spot! The magnetron of those days was a very simple device, and it didn't have anything to do with radio at all. In fact, Hull thought of it as a means for turning high voltage d-c on and off. Figure 1 shows how this can be done.

Hull's original magnetron, which is illustrated very schematically at the top of Figure 1, consisted of a hot central cathode, a tungsten filament in early magnetrons, and a concentric cylindrical electrode called an anode which surrounded the cathode. These electrodes were sealed up in a thoroughly evacuated bulb so that electrons emitted by the cathode could move freely in the space between the cathode and the anode. Now, suppose the anode were held hundreds or thousands of volts positive with respect to the cathode. All the electrons which boiled off the cathode would be drawn over to the positive anode and some total current I would flow in the anode circuit. What Hull did was to add a magnetic field to the picture, a magnetic field with lines of force parallel to the axis of the anode and the cathode. When electrons move across lines of force, they are deflected in a direction at right angles to the magnetic field. What happens to them as the strength of the magnetic field, B, is made greater, is shown from right to left at the top of Figure 1. With zero magnetic field (B=O) the electrons move straight across from cathode to anode. As the magnetic field strength B is increased, the electron paths become curved. All the emitted electrons will flow across to the anode, however, and, as the curve at the bottom of the figure shows, the anode current I is still unchanged. But, finally, a critical field strength is reached, called B_c, or the cut-off field. With a magnetic field this strong, the electrons are bent around so sharply that they miss the anode and return to the cathode. Ideally, the current to the anode would suddenly cease when the field strength was raised beyond B_c. Because of various effects which even the smartest physicists don't know much about, the current doesn't suddenly stop as the field is raised above the cut-off value, but the current to the anode does fall rapidly, and the bending of the electron paths becomes sharper and sharper, so that the electrons whirl about the cathode within a smaller and smaller radius, and in sharper and sharper orbits.

This, then, was the magnetron in 1921. It wasn't a radio tube at all. It was a means for controlling currents at high voltages by means of a magnetic field. You can't keep a good tube down, though, and it wasn't long before experimenters found out something about magnetrons almost in spite of themselves. When the magnetic field in magnetrons is high enough so that electrons can just barely reach the anode, or even high enough so that electrons shouldn't be able to quite reach the anode, the magnetron tends to oscillate and generate radio-frequency energy. Such oscillations

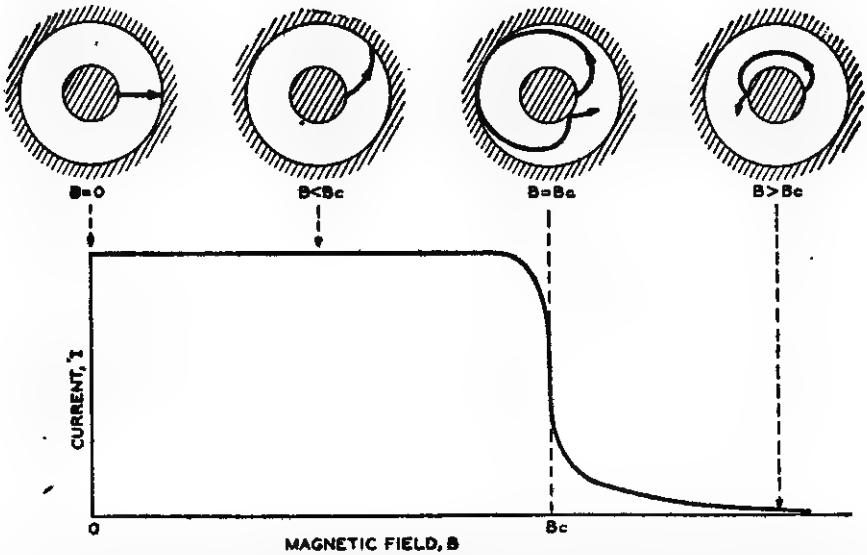


Figure 1: When the magnetic field of a magnetron reaches a certain value, the "cutoff field," B_c, the electron paths are so bent that they miss the anode and the anode current falls almost to zero.

were first reported by A. Zacek of Czechoslovakia, in 1924. By 1929 K. Okabe of Japan had found out something about these oscillations. They occurred at such a radio frequency that an electron left the cathode, circled around in the magnetic field, and returned to the cathode in just one cycle, that is, in the time it took the radio-frequency voltage to change from positive through negative and back to positive again. The time it takes an electron so to circle around is almost entirely dependent on the strength of the magnetic field, and so for this sort of oscillation a particular magnetic field is required for a given frequency of operation, and, indeed, the frequency and the magnetic field are proportional to one another.

When the relation between the frequency of oscillation and the time for an electron to circle about had been discovered, it was possible to give a simple theory explaining why the magnetron oscillates in this manner. Suppose we imagine a resonant circuit connected between anode and cathode, so that a little radio-frequency energy of the proper frequency, derived from the magnetron, will cause a large radio-frequency voltage of the same frequency to appear between cathode and anode. It is found that when electrons swing about in their orbits in the magnetic field in synchronism with the radio-frequency voltage, they either gain energy from the radio-frequency field, and swing around in wider and wider orbits as time goes

Figure 2: These are anode and resonator systems for various World War II magnetrons, known as anode blocks. The central hole is the anode, and the cathode is supported concentrically in it (see Fig. 5). Copper plates brazed over the ends form a vacuum-tight envelope. The biggest anode block is for a wave length of 43 centimeters. The others, proceeding clockwise, are for 23 centimeters, 23 centimeters, 11 centimeters, 10 centimeters, 3.2 centimeters, 3.2 centimeters, 1.25 centimeters. The cube is 1 inch on a side.

on, or lose energy and swing in smaller and smaller orbits. Whether an electron gains or loses energy depends on the particular time—or, phase with respect to the radio-frequency voltage—at which it starts. Now, if an electron gains energy and swings around in a wider orbit, it swings out and runs into the anode, and that's the last of it. But, if it loses energy it misses the cathode, it swings round and round many more times, losing energy all the time to the radio frequency circuit and thus supplying power both to keep the radio-frequency voltage high and, perhaps, to transmit radio signals as well. This is the picture of how the magnetron oscillated in the early days. Electrons which took energy from the circuit were quickly eliminated by running into the anode. Electrons which lost energy continued to lose energy, and the energy went out of the tube as radio-frequency power. And, one thing

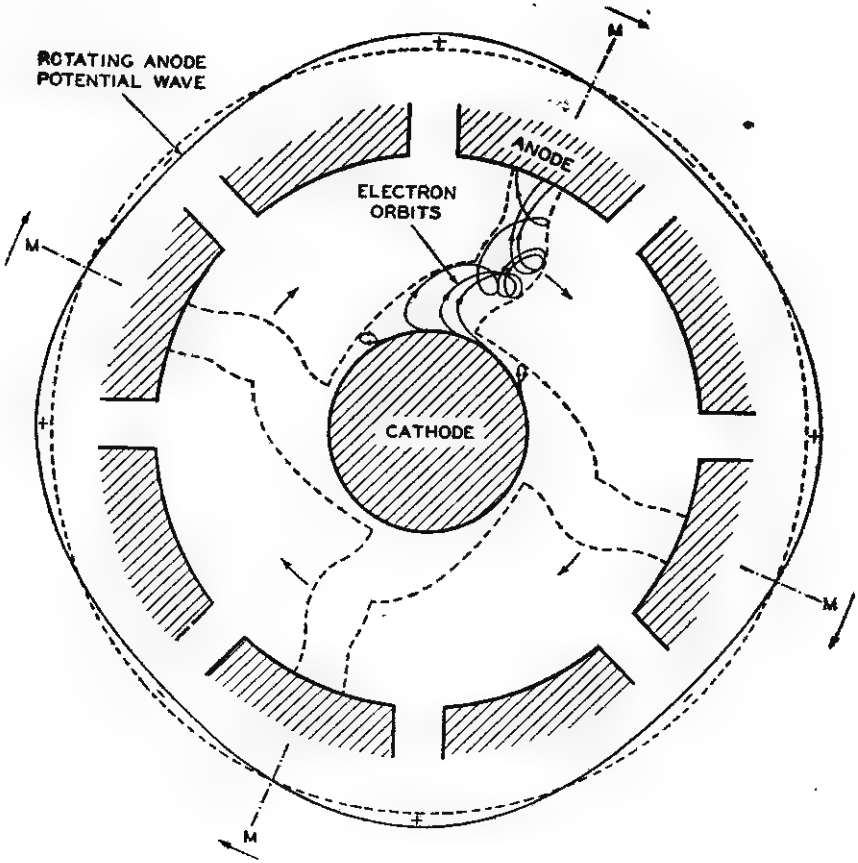


Figure 3: The anode segments of the magnetron are alternately at plus and minus radiofrequency voltages around the anode, and the voltage on each segment oscillates between plus and minus with time. The resulting electric field can be resolved into two components, one rotating in the same direction as the electrons and the other in the opposite direction. The counter-rotating field has little effect. The field which rotates in the same direction as the electrons forms them into long spokes and these sweep past the anode segments and generate radiofrequency power.

should be added: the magnetron used in this way was a pretty bad oscillator! For each watt of d-c power supplied, one got out perhaps a hundredth of a watt of radiofrequency power. In other words,

the efficiency was around one per cent, and you might keep that in mind. Further, the magnetron was very tricky to operate. After electrons had lost energy a while, they started to pick up energy again, and hence they had to be removed from the field. To do this, the tube was tilted in the magnetic field at a very critical angle, which had to be kept just right. In the 1920's the magnetron oscillator was more a scientific curiosity than a success.

Of course, engineers and scientists made some effort to fix things up, and to get better operation of fundamentally the same kind. One trouble we run into in using the magnetron as Hull made it is obvious. The radio-frequency circuit is connected between the filament and the anode. This is not only an unsymmetrical sort of connection, troublesome at high frequencies, but, also, the hot cathode has a high resistance, and introduces radio-frequency losses which eat into the power. It was probably to overcome these difficulties that the cylindrical metal anode of the magnetron was first split into two halves by slits parallel to the cathode, and the radio-frequency circuit was connected between these two segments of the anode. Or, this may have been done for some other reason. At any rate, Habann, a German, who did it in 1924 found a totally new type of oscillation in the magnetron, called a negative resistance oscillation. Negative resistance oscillations can occur over a wide range of frequencies, not critical with magnetic field, and they are most efficient at comparatively low frequencies. I won't say anything more about them here. But Okabe and Yagi of Japan found the other, older type of oscillation which we have described in the split plate magnetron, and it was much stronger and more efficient than it had been when the circuit was connected between anode and cathode. It looked for a while as if the day of the magnetron had come.

Indeed, the day of the magnetron had come in an experimental sense. Workers in many countries made magnetrons which would generate power at wave lengths of fifty centimeters—where triodes would work in the 1930's—then at twenty centimeters—where triodes would just barely work before World War II—at ten centimeters—where we had only the relatively new kylstron before World War II—and at wave lengths shorter even than one centimeter, which are still short enough to excite wonder. Why wasn't the magnetron the tube of the hour in those days? There were a number of reasons.

The prewar magnetron was tricky to operate, and rarely had an efficiency higher than ten per cent when operated in the manner we have described. At a wave length of ten centimeters it would give perhaps a watt, which wasn't enough for radar. This *was* enough power for radio communication using narrow focused beams, but the frequency of the magnetron wandered around too much for communication purposes. Too, there was no effective way of modulating it, that is, impressing a

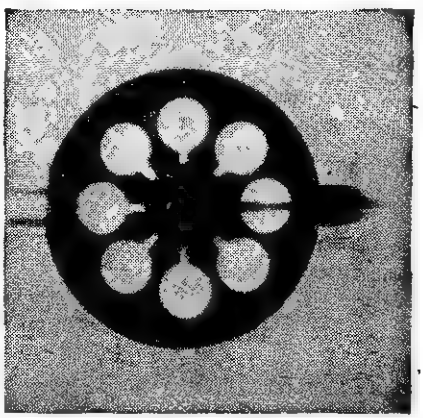
speech signal on the output. In all, the prewar magnetron was still an experimental tool, although a very useful one.

Reading this ancient and inauspicious history of the magnetron, we might lose interest if we didn't know there was to be a happy ending later on. What was wrong? How did the early, cranky, ineffective though interesting magnetron of prewar days become the wonder tube of radar? What was the new thing, the vital change which made all the difference. Well, there were two changes, and perhaps the story is best continued by telling who first made them.

One of the changes was a change in the sort of radio-frequency resonant circuit used. We usually think of a resonant circuit as consisting of a coil of many turns and a condenser of interleaved plates, the sort of thing we have in a radio tuner. The resonant circuits which were connected between the two halves of the split anode of early oscillating magnetrons were about like that. As magnetrons were made to oscillate at shorter and shorter wave lengths—higher and higher frequencies—the turns in the coil were made fewer and fewer until finally only one was left, and the electrical capacity between the two halves of the split anode finally was in itself sufficient to tune the circuit. Still, the split anode was in the vacuum envelope, and the coil was outside. Later experimenters put the coil inside. Then, it occurred to someone to put the coil inside of the vacuum. The final step is exemplified in the collection of magnetron anodes—not prewar!—shown in Figure 2. Here the anode—the central circular hole—is split several times around the circumference. Radial slots extend out to other holes paralled to the anode hole, and these holes are just the single turn coils of the resonant circuit. The capacitances across the radial slots and the inductances of the holes replace the familiar condensers and coils of low-frequency circuits. As I explained, the magnetron anode-and-resonator structures shown in Figure 2 are strictly World War II stuff—but the general arrangement was patented by an American, A. L. Samuel, in 1936.

There is another feature which made the World War II magnetron deliver kilowatts and even megawatts when its predecessors had de-

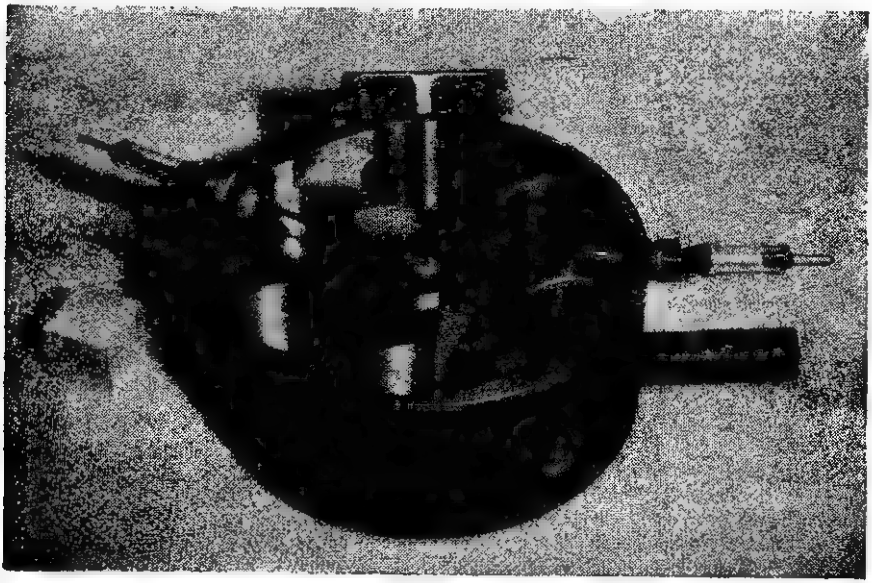
Figure 4: X-ray photograph of the original high-power magnetron, brought to this country by the British in the fall of 1940.



livered watts, and at efficiencies ranging above fifty per cent when prewar tubes had been good at ten per cent. That is an entirely different manner of producing power, not at all like the resonant electron motion already described. In 1935 K. Posthumous of the Philips laboratory in Eindhoven, Holland, published an important paper. He deduced theoretically that in magnetrons with multi-segment anodes, at magnetic fields much higher than those ordinarily used with a given anode voltage, the electrons should move so as to produce power with remarkable efficiency. Posthumous not only deduced such operation theoretically; he produced it experimentally. With a comparatively crude magnetron operating at a wave length of fifty centimeters and longer, he attained efficiencies of around fifty per cent. Surely, this is worth looking into further. Just how did the electrons act to give this unprecedented result? Figure 3 will give some clue.

In Figure 3 we have a multi-segment anode and a central cathode which emits electrons. There is, of course, a magnetic field perpendicular to the plane of the paper. The anode is made positive with respect to the cathode by an applied voltage, so that the electrons tend to be pulled out into the space between the cathode and the anode. The voltage is only high enough to pull the electrons out a little way against the

Figure 5: The Western Electric 700A-D magnetron, for a wavelength of 43 centimeters, a frequency of about 750 megacycles.



bending action of the magnetic field, however.

Now, there is also a radio-frequency voltage applied between the anode segments, in a +, —, +, — pattern around the anode. The voltage of any one anode segment will alternate from + to — and back again in one radio-frequency cycle. The fluctuating field produced by these voltages can be considered to consist of two rotating fields, much as the fluctuating magnetic field in a single-phase induction motor can be broken up into two rotating components. In the induction motor, the two rotating components of magnetic field affect the rotor differently, because the rotor is going around. The rotating component which rotates in the same direction as the rotor gets a better grip on it than does the counter-rotating component, and hence the rotor of the motor is dragged around and the motor operates.

From Figure 1 we remember that the electrons are bent around by the magnetic field in one particular way; in Figure 3 this is made to be clockwise. Now, the rotating component of electric field produced by the radio-frequency voltages on the anode segments which rotates *against* the direction of electron motion urges the electrons first in one direction and then in the opposite direction, and, on the average, does very little to them. However, the rotating component of electric field which rotates *with* the direction of electron motion has a cumulative effect on the electron motion, and that

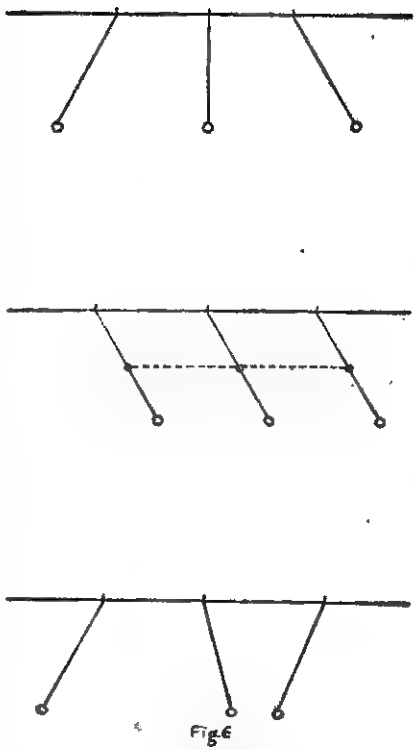
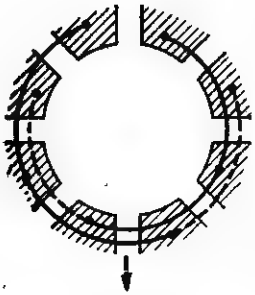
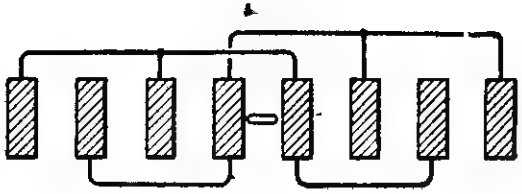


Figure 6: Three identical pendulums supported on a spring-supported bar have three modes of oscillation with different frequencies. By "strapping" the pendulums together, two modes of oscillation are blocked. This is analogous to strapping magnetrons.

cumulative effect is what makes the magnetron work.

When I described the operation of early oscillating magnetrons, in which the magnetic field had a very special value which made the electron circle out toward the anode and back in just one radio-frequency





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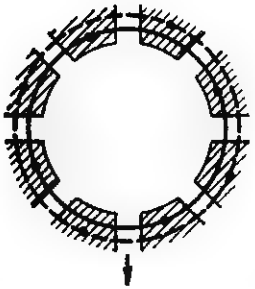

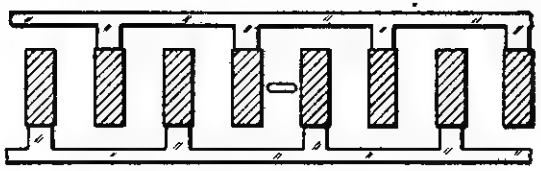

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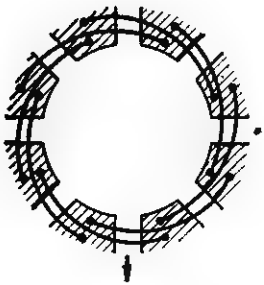

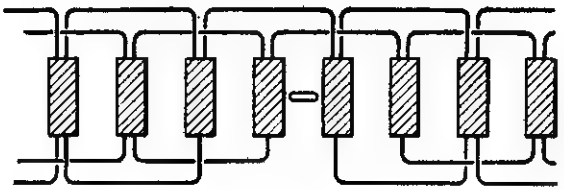

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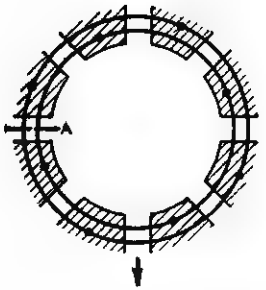
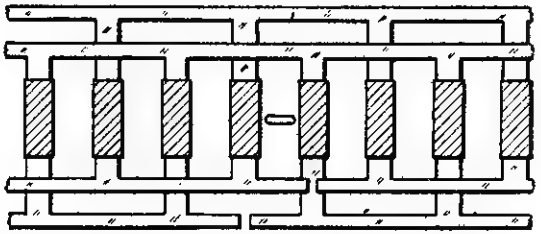




(d)

SEC. A-A
SHOWING LOCATION
OF STRAPS IN TOP
OF ANODE

cycle, I said that an electron which gained energy moved in a larger orbit and finally was lost on the anode. With a different magnetic field, in this new and more efficient form of operation, an electron which gains energy from the radio-frequency field executes a very tiny orbit and returns to the cathode, as shown in Figure 3. On the other hand, an electron which *loses* energy, supplying radio-frequency energy to the circuit, gradually spirals out toward the anode. As such electrons move out toward the anode, they continually take energy from the voltage source which keeps the anode positive with respect to the cathode. This doesn't make them go faster, however; instead, they circle around the cathode in a sort of spoke, keeping in such phase with the rotating component of electric field, which rotates with them, as to continually give up energy, and this energy appears in the radio-frequency circuits. Thus, the electrons rotate in a spokelike formation, in effect forming the rotating armature of a radio-frequency generator. And the device is so efficient that eighty per cent or more of the electric power supplied may be converted into radio-frequency power. The overall efficiency of the magnetron is not quite this high; some power is lost because of the electrical resistance of the resonator.

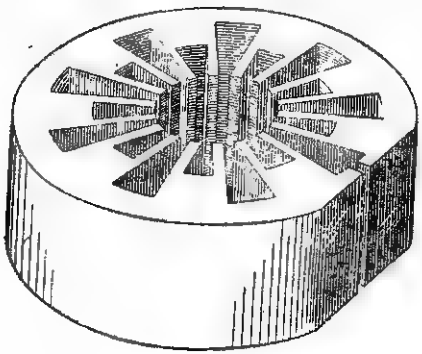
Here we have the two features which make the magnetron some tube: the hole-and-slot anode construction of Figure 2—proposed by Samuel in 1936—and the efficient form of electron motion of Figure 3—described by Posthumous in 1936. All one has to do is put them together, and, you might think, that was how the World War II magnetron was made. Brother, you'd be wrong! Incredible as it may seem, the men who made the predecessors of the anodes of Figure 2, if not the men who made those particular anodes, had never heard of Samuel's patent. And, Professor Hartree and his collaborators, who traced out the electron paths at Manchester University in England, shown in Figure 3, didn't hear about the work of Posthumous, done years earlier, until they had duplicated it and gone far beyond it. As far as the actual magnetrons used in World War II went, all the prewar work might as well never have existed except as hearsay. World War II magnetrons were developed by a group of English and, later, American physicists who were almost entirely ignorant of what had been going on. Perhaps this saved them from error. Certainly they deserve credit for their complete originality. Concerning their ignorance of earlier work—we can only be astounded.

Let's start out, then, entirely afresh, and see just where the superpower magnetron did come from. The general location is easy. It

Figure 7: Various methods of strapping in magnetrons. Alternate anode segments are connected together to discourage oscillations in which the voltage pattern is not +, —, +, — around the anode.

came from England. At the beginning of the war, and perhaps somewhat before, English physicists were drafted into service to work on radar. The English were rightly alarmed at the possibilities of German bombing. They had long-wave radar which would give an early warning of whole flights of airplanes, but they needed a precise device which would pick out and track individual airplanes, sending to gun batteries or to pilots the information which would enable them really to shoot German planes out of the air. To a group of very smart physicists—nuclear physicists—who were later transferred to work on the atom bomb—workers at liquid helium temperatures, and others—men who didn't know what couldn't be done in radio and radar, the answer was obvious. What was needed was microwave radar, because microwaves—wave lengths shorter than ten centimeters—can be focused into narrow, precise beams by antennas of reasonable size. Further, what was needed was a tube which would operate at, say, ten centimeters wave length and produce, in very short pulses, kilowatts of radio-frequency power. And, as I said, these physicists, being entirely ignorant of radio, didn't know that this couldn't be done.*

Figure 8: The rising sun or knit one purl one anode. This strange construction had the effect of strapping without its complexity.



They started out with klystrons, which they had heard about. These weren't satisfactory. Then, someway, inspiration dawned. There were some queer early stories about how the first modern magnetron came to be made. According to one, a physicist removed the cylinder from an old revolver, drilled out the center, put in a cathode and—the magnetron was born. This definitely wasn't so. All I do know for sure is that in the fall of 1940 a couple of British physicists arrived in America with a small and carefully guarded package. They took it to the Bell Telephone Laboratories, where work was in progress both on radar and on microwaves—the two hadn't got together yet—and on October 6, 1940, the new tube astounded all assembled by delivering pulses of over ten kilowatts at a wave length of ten centimeters, at the Bell Telephone Laboratories' radio laboratory at Whippany, New Jersey. Four days later they got around to taking an X-ray picture of this first tube, which you can see in Figure 4. By mid-November of 1940, a number of working repro-

* The German radar workers had had lots of experience with magnetrons. *They* knew it couldn't be done—until some magnetrons fell on them from the sky!

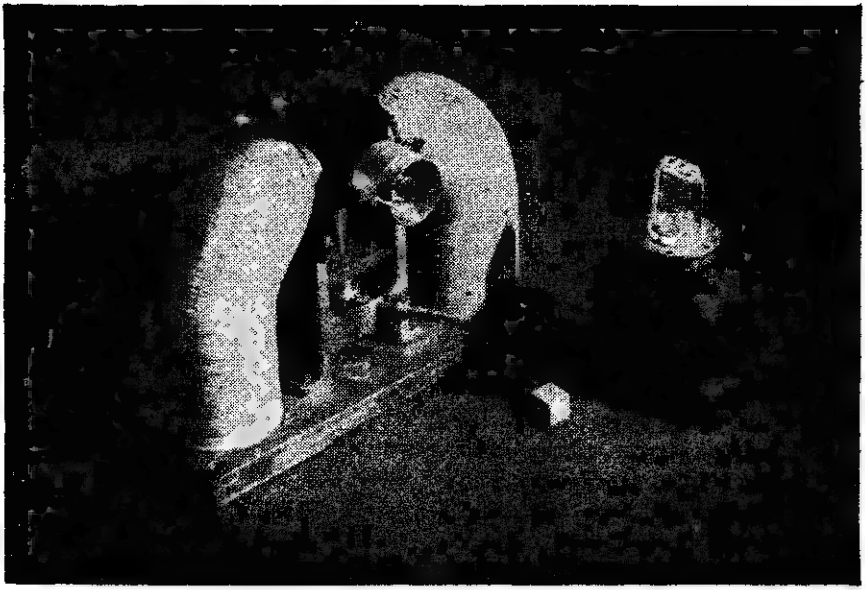


Figure 9: A megawatt magnetron for 10 centimeters and a 60 kilowatt magnetron for 3.2 centimeters.

ductions of the British tube had been made at the Bell Telephone Laboratories, and some had been supplied to the Radiation Laboratory at M.I.T., where so much American radar work was done.

The next sentence should definitely not be "After that it was smooth sailing." It wasn't. But now microwave radar *was* possible, and the general way to get the short pulses of many kilowatts needed was clearly indicated. There remained the tasks of making the magnetron more practical, of making it deliver even more power—and it got up to megawatts, finally—of making it operate at higher and higher frequencies, and, in the latter part of the war, the problem of tuning the magnetron. All of these problems were solved, by work at the Radiation Laboratories at M.I.T. and at Columbia University, by work at the Bell Telephone Laboratories, and elsewhere. Tubes were produced by the thousands in many places. But, it was a hard grind. What to do and how to do it were learned only through much effort and many mistakes. They were learned.

Suppose we look at some of the problems. Figure 5 shows an early American magnetron, the Western Electric 700A-D tube. This was an answer to the first problem which arose, if we want to call it a problem. The British magnetron oscillated at a wave length of ten centi-

meters. We didn't have any ten centimeter radar systems. We did, though, have forty centimeter radar, using triodes as oscillators. So, one of the first tasks was to make the magnetron *bigger*, so that it would work with the equipment available, giving increased range because of its high power. This was done, and the 700A-D tubes could be driven by the same voltage source, and coupled to the same antenna, which had been used with the earlier triode oscillators.

This and other longer-wave tubes represented, however, rather a side-excursion. The trend was to improve operation at ten centimeters and to secure operation at even shorter wave lengths. More power at ten centimeters meant trouble, and making the tubes smaller and smaller to secure operation at higher and higher frequencies meant still more trouble. The physicists and engineers faced their troubles with good humor if not equanimity, and invented fantastic names for the peculiarities of performance they encountered. Some of these "effects" are understandable in simple terms. The Civil War Effect, or North-South Effect had to do with difference in performance when the direction of the magnetic field was reversed. The differences proved to be due to asymmetries in the tubes, and disappeared when the tubes were made more accurately. The Blowing Out of Brains Effect had simply to do with the melting of a copper end cap which covered the end of the anode block of a small magnetron to form part of the vacuum envelope. The Gnawing Away of the Anode Effect was similar. The Gadarene Swine Effect had to do with the particularly precipitous descent of certain contours on a performance chart, and the Valley of the Shadow was a region of low-efficiency lying close to a high-efficiency region known as The Heights of Abraham.

Undoubtedly the worst effect was one perhaps too serious for a fancy name. It was called, simply, modding. An engineer in using an early magnetron would be adjusting the load, that is, the impedance into which the magnetron fed power, in order to get more power. Suddenly, the power, which had been rising, would drop, and he would find the tube to be oscillating feebly at some new and unwanted frequency a little removed from the old. Or, he would be gradually raising the voltage to get more power, and the same thing would happen. The tube was said to be operating in another mode of oscillation. Apparently, something inside of the tube was resonant at this frequency as well as at the desired frequency, and the physicists set out to eliminate the undesired resonance or resonances. They made some false starts; one early suggestion was that the several holes and slots which formed the resonant circuits—eight in the early British magnetron of Figure 4, six in the longer wave magnetron of Figure 5—were not quite the same size and hence were resonant at different frequencies. The correct idea came along before much effort had been

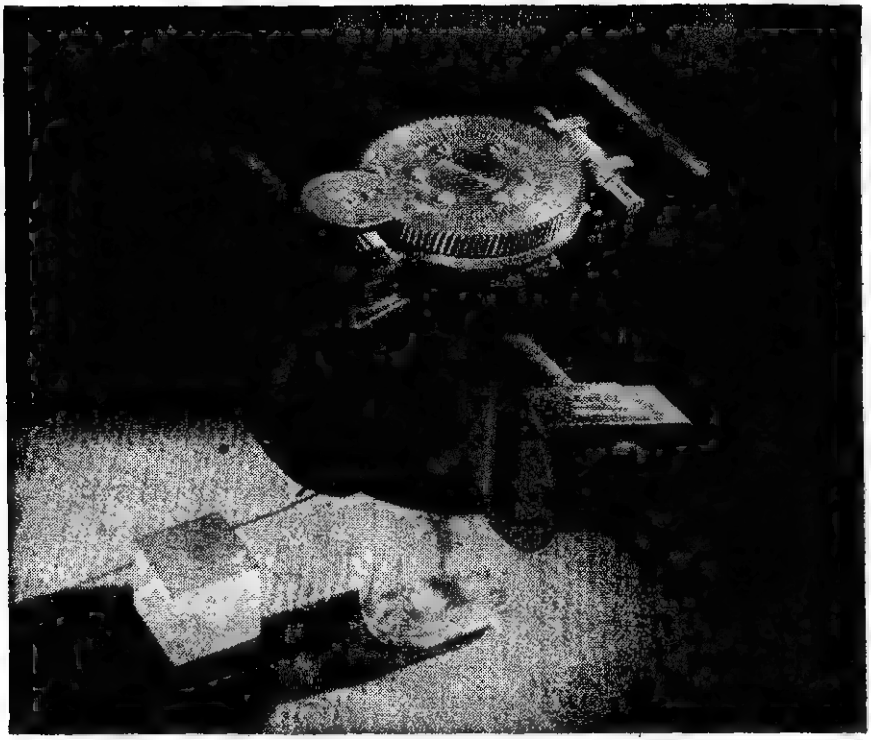


Figure 10: A tunable magnetron for 3.2 centimeters.

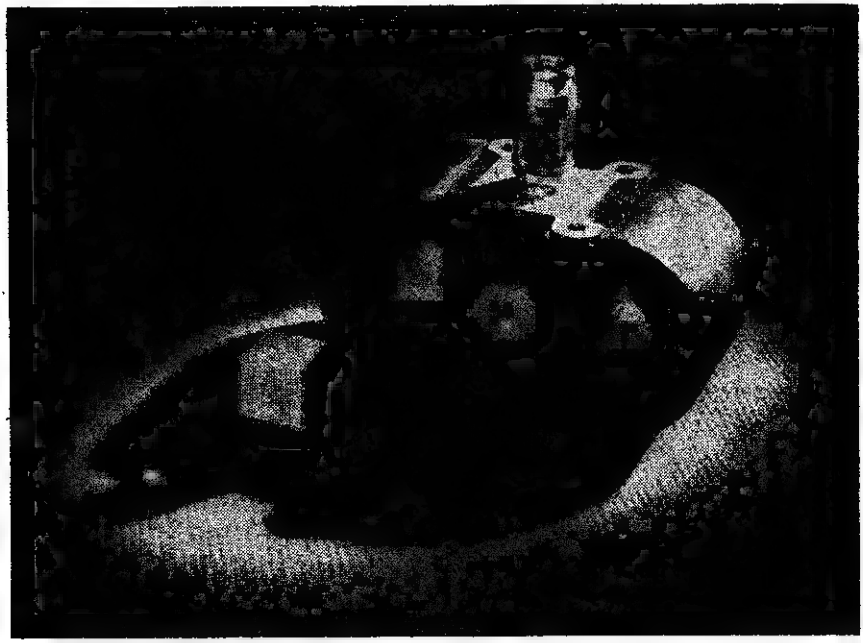
wasted making the holes and slots more accurate.

The truth of the matter is very simple. A magnetron with eight slots in the anode, forming eight little condensers, which open into eight holes, forming eight little single turn coils, has eight resonant circuits. Now, when eight resonant circuits, each of them the same, are close enough to one another to be appreciably coupled, as they are in a magnetron, there are usually eight separate resonant frequencies, each corresponding to a different field pattern inside of the anode, and only one of these field patterns is the one wanted. There is a very close analogy in the motions of several pendulums suspended from a common support which can move a little, thus "coupling" the pendulums together. For instance, Figure 6 shows three pendulums of just the same weight and length hung from a bar supported by stiff springs. This is something you can try, if you wish. Now, there are three simple sorts of motion or "oscillation" we can have. In that at the top, the center pendulum stands still and the outer two swing in contrary directions. In that

at the center, all three pendulums swing equally in the same direction. In that at the bottom, the center pendulum swings in one direction and the outer pendulums both swing in the contrary direction. If you start any of these three motions, it will recur regularly, unchanged in form, and each has its own particular frequency or time of swing. *And,* any more complicated motion of the three pendulums is made up of a combination of these three simple motions. The three simple motions are the *modes of oscillation* of the combination of three pendulums, and the three frequencies of swinging are the three *resonant frequencies* of the system.

Once the "moding" problem of the magnetron was reduced to these simple terms, it was easy to see one possible course of action. If you wanted the type of motion shown in the middle of Figure 6, you would simply tie the three pendulums together with a bar, shown dashed in the figure. Then the motions at the top and bottom would be impossible. In the magnetron, we want an oscillation such that alternate segments of the anode are +, −, +, − et cetera. Why not tie alternate segments together by pieces of wire or metal strips, thus insuring the right sort of oscillation? That is just what was done, and Figure 7 shows several forms of strapping. You can

Figure 11: Magnetron which gives 60 kilowatts at 1.25 centimeters.



see that most of the magnetron anode blocks of Figure 2 are strapped in one way or another. Was strapping a sure cure for the moding problem? Not quite, for the wire or metal strip used in strapping is not the equivalent of a rigid bar, but rather of a spring. If we tied the three pendulums of Figure 6 together with a spring instead of a rigid bar, we see that we wouldn't make the sorts of oscillation shown at the top and the bottom impossible. We would merely change the frequencies at which such oscillations would occur. So, strapping in magnetrons didn't get rid of the unwanted modes of oscillation entirely, but with luck it removed them to a frequency range where they weren't so troublesome. Still, the greater the number of resonators, the less effective the strapping. As it was advantageous to use many resonators in tubes for very short wave lengths, the strapping problem became increasingly difficult and finally, when a 1.25 centimeter tube was built, moding problems were solved by means of an unstrapped anode construction known as the "rising sun"—alternately, "knit one, purl one." I won't try to explain how the rising sun works.

The strapping of magnetrons made great advances possible. The British magnetron of Figure 4 delivered some ten or more kilowatts—carefully adjusted—with an efficiency around ten per cent. The Western Electric 720A-E magnetron, the big magnetron with the big magnet in Figure 9, delivered 1,000 kilowatts with an efficiency of about sixty per cent. Strapping was essential in achieving this performance. The smaller magnetron in Figure 9 is the 725A, a magnetron delivering fifty-five kilowatts at a wave length of 3.2 centimeters. And, the 725A brings us to an interesting story of tribulations.

Everyone liked the 725A. A lot of equipment was built to use it. Then, it was decided that there should be a new and improved magnetron for the 3.2 centimeter range. It should be tunable, so that several radar sets could be operated in the same area without danger of interference. It should be packaged, that is, a magnet of minimum size should be permanently attached to it, to save weight and facilitate installation. *But,* it should be interchangeable with the 725A, so that it could be used in existing equipment without modification. The somewhat tortured looking tube shown in Figure 10, the 2J51, did the trick. The tuning, incidentally, was accomplished by inserting an array of metal spikes known as a "crown of thorns" into the resonator holes.

The shortest wave length for which a standard magnetron was developed during the war was 1.25 centimeters. The magnetron was the Western Electric 3J21, shown in Figure 11. This tube gave a pulsed power of sixty kilowatts with an efficiency of twenty-six per cent. The tube used the rising sun anode structure shown in Figure 8. Here was a tube with a wave length scarcely more than a tenth that of the original British tube, yet with an effi-

ciency over twice as great, and a power output six times as great! Maggie had come a long way. The 3J21 represents a tremendous improvement on the British tube. But the British tube had been more than an improvement on what had gone before; it had been a new departure. When the British visitors brought it to us in their mysterious satchel in the fall of 1940, they brought microwave radar with them. Before that, tubes such as the 3J21 were unguessable. Soon afterward, they became remotely visible to the far-seeing eye.

THE END.

IN TIMES TO COME

Finding myself with the unusual opportunity of using nearly a full page for "Times", I can do a little more long-range predicting this month. But first, as to next month.

Jack Williamson's story ". . . And Searching Mind" starts off—a three-part sequel to "With Folded Hands . . .". You can readily see the point deliberately played down, left out, and steered away from in the first story but Jack's development of the omitted theme in "Folded Hands" will give you considerable something to think about. Williamson always has been able to turn out a yarn and this one's no exception.

In the longer future, several excellent novels are shaping up. For one, Will Stewart's back home, too, now and working on a new seetee story. This one will be a novel, probably, and due to come up a few months hence.

Then, too, Eric Frank Russell's been working on a novel that shows signs of developing into something as potent as was his "Sinister Barrier" that started off the old *Unknown*, in its first issue.

In the novelette department, we have an intriguing Murray Leinster yarn for next month, an item called "West Wind" concerning an unstoppable weapon that was really, a very gentle seeming thing—as gentle as a summer breeze.

There've been a number of requests, for a number of months, for another tale of Gallagher, the well-oiled super-scientist. Lewis Padgett's done another, which is due up month after next. The narcissistic robot is present, but unhelpful as usual. This time Gallagher is really in a bad way—for him—due to the presence of a mysterious Thing that consumes every drink he pours—except water—before he can so much as taste it. The fabulous beer-can opener informs him it's a small brown animal, but Gallagher's eyes aren't fast enough to spot it.

The article department is thriving, too. R. S. Richardson has an article, "Man On Mira" coming up, with an astronomical cover painting by Bonestell. Ever wondered what the shadows would be like on the planet of a double sun? Particularly when, like Mira, one is a super-giant red and the other is a giant blue-white, of vastly smaller diameter, yet equal brilliance?

Alejandro will be back with a magnificently drawn painting of the ages of Man I like it even better than his present Atomic Power cover.

And beyond that is another Bonestell to accompany Richardson's next article. It looks as though astrophysicists have finally figured out how planets were actually formed—and how Suns come into being. The result is an article of truly cosmic sweep—and a Bonestell painting of a sun in process of formation.

THE EDITOR.

BOOK REVIEW

THE MISLAID CHARM, by Alexander M. Phillips; Philadelphia: The Prime Press, P. O. Box 2019, Middle City Station, Philadelphia 3, Pa. 1947, 92 pp.

Lex Phillips' short novel "The Mislaid Charm," which first appeared in Street & Smith's *Unknown* for February, 1941, has been added to the rapidly growing list of science-fiction and fantasy magazine stories which a number of small publishers—mostly fans and connoisseurs of this kind of fiction—have been bringing out in book form during the past two years. It is one of the most welcome additions to the list, being that comparative rarity, a first-rate humorous fantasy.

As almost any editor will tell you, good humor is in short supply like many other things today. Non-fantasy writers tend to fill their stories with social significance, thereby imparting to them the dull gray tone of an economics textbook, while fantasy writers continue to tell us how "my scalp prickling with eldrich horror, I watched the obscenely blasphemous monstrosity slither toward its prey." All very well in its place, but we do like to laugh once in a while. All praise to Phillips for enabling us to do so; and if much of his comedy is on a slapstick level, so what? Good slapstick provides as good a catharsis as any kind of humor.

In "The Mislaid Charm," a dour and rather unsophisticated young author, Henry Pickett, sets out to celebrate his first big sale. Presently he runs afoul of an imp or elf, Rivkin, who is a fugitive from a community of upstate elves whose tribal charm he has stolen. When the elfin posse, headed by the bewhiskered and sulphurous Van der Wisken, closes in, Rivkin caches the charm in Henry's chest—unknown to Henry, who is naturally surprised when things he casually wishes for materialize—and still more astonished when things he doesn't wish for, such as live pigeons and monkeys, begin materializing about him as well. For the charm, freed of proper control, goes off on a spree of its own. Action becomes steadily more riotous throughout the evening, in the course of which Henry acquires a Junoesque blonde who sees him through the climax.

To show that this isn't just a publisher's blurb, I have a few minor criticisms to make. I don't mind the author's use of another author for

his hero—objected to by some writers as a tyronic practice—nor to the fact that many of the gags have been pretty well worked over by others—Thorne Smith, for instance; such things are all right if you can get away with them, and I think Lex does. However, he shouldn't have laid on the dialects—Henry's drunken and Van der Wisken's Dutch—so thickly; dialects should be applied, not with a shovel, but with a salt spoon. And it's disappointing to have the hero, just when he shows signs of developing some interesting character about halfway through, get so drunk that for the rest of the story he is practically an inert mass tossed on the sea of fate. Finally, I wish the story had been at least fifty per cent longer; although the author probably couldn't have sustained his present high level of hilarity, I think it would have been worth it. But then, I know from personal experience that when a story has once set or hardened, the author may find it virtually impossible to remold it into a notably different form.

All things considered, however, the yarn is good for a fine two hours of belly-laughs, which is ample justification for its publication, and for your acquisition of it.

L. Sprague de Camp.

SCIENCE FICTION BOOKS

The following listing of books of science-fiction, or of science-fiction interest may remind you of some you've missed and want. The books are, at the moment, still available from the respective publishers. Some, however, are small editions, and soon exhausted.

"Adventures In Time And Space"—Random House, 457 Madison Ave., New York, N. Y. $2.95

"The Best of Science Fiction"—Crown Publishers, 419 Fourth Ave., New York, N. Y. $3.00

"The Forbidden Garden," by John Taine—Fantasy Press, Reading, Pa. $3.00

"The Legion of Space," by Jack Williamson—Fantasy Press, Reading, Pa. $3.00

"The Mislaid Charm," by A. M. Phillips—Prime Press, Philadelphia, Pa. $3.00

"The Mightiest Machine," by John W. Campbell, Jr. Hadley Publishing Co., Providence, R. I. $3.00

"The Skylark of Space," by E. E. Smith—Hadley Publishing Co., Providence, R. I. $3.00

"Slan," by A. E. van Vogt—Arkham House, Sauk City, Wisc. $2.50

"Spacehounds of IPC," by E. E. Smith—Fantasy Press, Reading, Pa. $3.00

"The Time Stream," by John Taine—Buffalo Book Company, Buffalo, N. Y. $3.00

"Venus Equilateral," by George O. Smith—Prime Press, Philadelphia, Pa. $3.00

"The Weapon Makers," by A. E. van Vogt Hadley Publishing Co., Providence, R. I. $3.00

Books not science-fiction, but of science-fiction interest.

"The Atomic Story," by John W. Campbell, Jr.—Henry Holt & Co., New York, N. Y. $3.00

"Of Worlds Beyond,"—Fantasy Press, Reading, Pa. $2.00

"Rockets And Space Travel," by Willy Ley—Viking Press, New York, N. Y. $3.75

BRASS TACKS

That cataloguing would help—but that would include not only all current output, but all papers from all planets for all years of all history! Name a subject like "Biochemistry" and see what happens!

Dear John:

While I had a few minutes to spare, today I glanced at the August issue of ASF in a reading room—the first copy I've looked over for several months. I had time to read only Ye Ed's page and the science article—and the little "squib" which announced the probable publication date of E. E. Smith's new serial—which was really what prompted me to write you. For, although I have time for little or no fiction-reading now, my two dozen years of acquaintance with the science and fantasy fiction field assure me that a real treat is on the way, and I shall not only "hound" the newsstand for the November and subsequent issues, but, from experience, I intend to buy two or three extra copies "for file." In past and present imaginative fiction, only a bare handful of authors have shown themselves capable of presenting truly original concepts. All of these, with the exception of A. Merritt, have contributed to this magazine—one of them is its present Editor—and the one with perhaps the widest range of new concepts is—you guessed it—E. E. Smith.

Thanks for the figures on the probability of mankind "multiplying and replenishing" a planet and a galaxy, under good conditions. I had wondered about this but never took the trouble to figure out the possibilities. However, friend John, I'm surprised at a scientific mind of your caliber making the deductions near the end of your editorial—was it "muddy thinking" or were you just trying to raise comment? Your statements in regard to a Journal for a galaxy-wide engineers' association are, of course, based on present-day technology. However,

since you postulate a means of travel and communication several times light-speed, allow me to suggest several other probable innovations: In that day intelligence will no longer be communicated through the printed page carried via the post. A perfection of the Ultrafax printer, in connection with the traveling-wave tube mentioned in your science article, will enable transgalactic beams to carry typed material at the rate of six to twenty billion words per minute, per beam. Each household will have its printer, tuned to the News Service channel, offering a pre-determined ratio of local, regional and system-wide releases. Another channel will carry "special interest" material, such as scientific papers, et cetera on a pre-coded time schedule, so that an automatic clock-switch will select only the material in which the subscriber is interested. (Remember, the Ultrafax will handle photos with high-definition, so you could continue to carry your rotogravure section.)

Of course, with so many technicians turning out technical papers, communication wouldn't be the limiting factor—the individual just wouldn't have time to read it all, if he spent all his time at it. Therefore—either tighter specialization, or better organization. Let us suppose that mankind will have learned to use the basic science of organization and co-operation, and that regional and central information centers will be established, to receive, store, digest and re-disseminate this vast flow of knowledge. These, with their electronic auto-indexes—"memories," that is—correlating switch-panels and huge staffs of specially-trained personnel will make our present libraries seem as archaic as Egyptian tomb-pictures. (An extension of that idea might also outmode our universities—a sort of "ICS-via-television".)

We might go a step further and imagine the dislocation to this system which would result from the very probable "discovery" of a planet or system which was much advanced beyond ours in certain fields—but, with this sintered-carbide "bone" for your mental teeth to munch on, I leave you to consider the (ultra) fax.—Lamont M. Jensen, 827 Dowington Avenue, Salt Lake City 5, Utah.

I fully agree—and might add "It is later than you think!"

Dear Mr. Campbell:

Believing, as I do, that readers of Astounding are representative of both the most intelligent and at the same time the most imaginative elements of the public, I would like to suggest that you present to them an editorial on the Emergency Committee of Atomic Scientists—the organization itself, its aims and purposes.

In late months, in fact since the first Atomic Bomb was dropped on Japan, Astounding has taken a realistic and vital view of the problems involved, both in the factual articles and in the fiction pieces. That these problems are a frightening distance from ultimate solution even today

is a distressingly apparent fact. Every hour that passes brings us closer to the day when some of the events predicted in gloomy fiction will become reality.

The Emergency Committee of Atomic Scientists, headed by such men as Albert Einstein and Harold C. Urey, offers the only intelligent solution. Even they may fail, though, for lack of understanding and support. People must be told about their work. The people, not only of this country but of the world, should know what this group of men is attempting to do. And in a very few words, their program is this: 1. A real and workable international control for atomic energy, and 2. Ultimately a supra-national agency for the elimination of war either with or without atomic energy. With clear-headed singleness of purpose, they are striking at the very roots of the evil that has caused every war in history. Nationalism. They see that the planet has outgrown the concept of nationalism and national sovereignty, and that we must in fact be "One World."

This committee in action is the very thing that has been propounded in the scientific fiction of the past three decades. It is the foundation of a scientific council, sans "ivory tower," that may one day guide an intelligent and integrated world to a much higher destiny than we can now dare to imagine. It is a beginning, and an important one.

But they must have support, and, of course, money. Money to extend their campaign of education. I believe that the readers of Astounding would be willing to help them. The science fiction addict better than any other has the picture of what will happen in the event of Atomic War. And he has the necessary flexibility of mind to understand the concept of supra-nationalism so necessary to the ultimate elimination of war as an instrument of national policy.

The United Nations *must not* be allowed to fail. Where weaknesses exist in its structure, it must be mended. Where misunderstandings and suspicions are rife in its membership, they must be eliminated. I believe that no agency is so well able to campaign for these aims as the Emergency Committee of Atomic Scientists. They made the Bomb possible. They know what it can do. And they know what *must be done* to save the world from sheer hell.

If I seem rather vociferous about this, it is only because I believe so strongly that this Committee is important. And I believe that your readers will agree. It *is* important. It is hope to a frightened world, and knowledge to an ignorant one.

I had better add that I was not approached by the Committee or any of its membership to write this letter. I have done so because I feel that any help this brings the Committee will be my part of a contribution that may one day very soon decide the fate of millions of lives. To me, that's worth while.

The address is: Emergency Committee of Atomic Scientists, Room

28, 90 Nassau Street, Princeton, New Jersey. Ask your readers to write them and ask for information. Let them decide for themselves if these men merit support. I'm certain that their decision will be in the affirmative.—Alfred J. Coppel, Jr., Route 1, Box 545, Los Altos, California.

Everybody seems to want Unknown, *and that includes us. But* Unknown *wants for paper still.*

Gentlemen:

What's the meaning of all these references to *Unknown Worlds?*

If you have started publishing my favorite again, for Heaven's sake please send me whatever issues you have already published. If you are just thinking of it, please think harder and maybe you can get around to it.

At any event, please consider this a subscription and bill me as soon as you get the magazine I love back on the market.

Just as a matter of interest, I have in my possession a copy of every issue you put out up until the time you stopped publication, and I should hate like everything to miss out on them when you started in again. I don't really trust the newsstands out here to be on their toes when it comes to picking up anything new.

Next to *Unknown Worlds* my favorite current fiction is Astounding, but good as it is, I'd rather have my fairy tales. I like pixies much better than pilots, even space pilots. —Gertrude M. Carr, 208 Allison, Seattle 2, Washington.

The excellence of tonight's dinner, the success of today's work or the flatness—in the rainstorm—of the left rear—tend to influence a standard rating scheme unduly. Besides, readers won't all do it—which makes things difficult. The idea's good, but I'm afraid I can't make it work.

Dear Mr. Campbell:

I have a suggestion for the Analytical Laboratory. Why don't you set up some kind of constant numerical value for the quality of each individual story instead of the present system of rating each of the stories in relation to the others of the same issue? The situation that you mention in the July AnLab concerning the April issue could be neatly sidestepped in this way. A scale of 1 to 6 or of 1 to 10 could be used with permanent values of quality—excellent to terrible—or some such. Then an averaging of all grades mailed in could be used to determine the comparative 'general feeling of the issue as a whole'—a good issue would have a lower point score average than a not-so-good issue. Then, too, a grade of 2.31 in one issue, for instance, would be the same as a 2.31 in any other issue—which it decidedly is not at present. I don't believe there would be the same confusion over ties, either. How about mentioning the idea in the next AnLab or tossing it into Brass Tacks for approval or otherwise. I think a grading system such as this would give a much clearer picture of the progress of Science

Fiction rather than the narrow view one month wide we now get.

Cartier is magnificent. For several months some character named Swenson did all your illustrating. That was not good. Redeem yourself with several months of illustration throughout by Cartier.

Your advance notice about the Alejandro cover has certainly aroused my interest as one who likes non-objective painting—Bauer, Kandinsky, Moholy-Nagy, et cetera—and thinks it a perfect medium for science fiction. The authors have been talking about it for years. (The screen of the color-graph was filled with moving brilliance that changed and grew in continuous patterns—spiral upon lightning—oval modulating to sphere—now green then to palest azure luminescence. I hope you don't disappoint me. By the way, how many years is this paper shortage going to last? I'd like to read *Unknown* again—as well as more than five stories per issue in Astounding.

My Lab rates on the August issue.

1 Excellent—read again—and again.
2 Good!
3 Nice
4 Average
5 Not good
6 Dislike

Insomnia Inc.	4
Person From Porlock	3
Rat Race	4
Propagandist	3

I don't give many stories 2's and a 1 is rare—also I like to read and report on serials as units hence no grade for "The End is Not Yet."

—Stanley G. Cooke, 5046 La Roda, Los Angeles 41, California.

We're trying to get more paper, naturally, but there is really a fairly solid chunk of reading as is. It's about 72,000 words per month now—longer than the average $2.50 novel.

Dear Mr. Campbell:

Is Astounding eternally doomed to the small format? This miniature with its four or five stories an issue gets me down. After one evening of entertainment, I have no recourse but to read the stories over again and sweat it out until the next issue. Mayhap the paper situation is still desperate, but I look hopefully to the day when Astounding bursts forth in the larger size with more stories *and* the rotogravure.

Paul Gunn, in his July issue letter, turned out a swell idea. An Astounding anthology would make up a thousand fold for the stories which might have been published had size permitted. J. C. May, 2334 N. 76th Court, Elmwood Park, Illinois.

Van Vogt mixes in some non-Roman history in some of the coming Gods series—with interesting results.

Dear Mr. Campbell:

It's getting to be quite some time since I last sent you any comment, favorable or otherwise, on Astounding S-F, around six and a half years or so now, I think. A few

years of that time were taken up by a tour of the world with our Royal Navy, and now that I've been back in circulation again for something over a year, and managed to catch up with a reasonable section of your wartime output, I'm beginning to feel that I am qualified to mail you a few words of wisdom now and again. And with the cheering prospect of my subscription coming through soon—I hope!—I'll endeavor to get off the mark earlier than this with my future letters.

I notice that your British followers are markedly absent from "Brass Tacks" these days; I can only presume that this is because of their reluctance to write, or the attitude of 'we're quite satisfied with the mag, so why should we bother the editor unnecessarily?" I think maybe that's the answer—it certainly is not because no one reads Astounding over here. And dissatisfied readers, especially the fans, would have told you all about that by now! So . . .?

Turning to something of more practical use to you—though I guess it's really too late now—ratings for July:

1. "With Folded Hands"
2. "Fury"
3. "Logic"
4. "The Figure"

Not many comments to make. I think that Williamson has kinda matured since '39-'40, that's the only way I can describe the difference that I feel in his recent work. "With Folded Hands", for instance, grapples very realistically with a truth that is rarely admitted—the impossibility of perfection. That perfection for which we all—maybe not consciously—strive, and yet, when we reach it, or, if we did reach it, we wouldn't know what to do with it; we just wouldn't want it, we wouldn't like it in the least. But I liked the story, particularly as man, the invincible, didn't win.

Anderson is a useful addition, does he do anything else beside mutants? I hope so. Pity the illustration took the snap out of Grendon's short.

Referring back to the previous month, I liked van Vogt in "Centaurus II", a sticky problem handled very well, but the ending was rather an easy get-out. But, I regret to say that his Clane series does not register with me, you see, I've read it all before, but the guy's name was Claudius and the parallel is just too, too obvious.

Glad to see the return of Rogers and Schneeman, I hope you give them plenty of work in future. But I wonder why Charles picked James Mason as the central figure for his "Centaurus" cover?

I don't suppose you'd happen to know anyone wanting to give away 1940-45 Astoundings, No? I didn't think you would —Don J. Doughty, 31 Boxwell Road, Downham Market, Norfolk, England.

Let's see—Street & Smith has published 168 consecutive monthly issues, and I've edited 120 of

'em, so this reader started with the—m-m-m . . . er . . . well, you figure it out!

Dear Mr. Campbell:

Well I have just been prowling around in my files of your magazine and I find that I am now past the century mark. According to my records I now have one hundred and two copies of Astounding and that should qualify me to speak up about the magazine.

In all the time I have read the magazine there has not been the slightest doubt in my mind that it is the cream of the crop. Almost without exception the stories have been good. Even the black sheep of the flock have been above most of the feature stories of your competition.. I am especially glad about the fact that the stories have been of a type either to make a person think or have been for pure enjoyment. There have been few of the old shoot-em-up thud-and-blunder stories where there was action merely for the sake of action and to cover up the fact that the story had nothing else but action.

I have just finished rereading a number of "old" stories from my files, stories that are old in time only, not in interest or in content. These old stories have even yet the appeal, freshness, and interest which they had six or eight years ago. Of course I am referring to such classics as "Gray Lensman", "Slan", "Final Blackout", "Second Stage Lensmen", "Sixth Column", "The Cloak of Aesir", "Black Destroyer", "Universe", "The Weapon Makers", and so many others it would take pages to list them. Some of them I have read as many as four or five times at least and every time I read them again I get a little more insight into the meaning and significance of them.

I was very happy to read in the last issue that Dr. Smith will soon have a new story out. If it is only half as good as the last two were, it will have been worth the almost six-year wait. By way of complaint what has happened to the "Foundation" and to the "Mixed Men". They were very good stories and some more of them would be appreciated by all concerned.

I suppose I should make a rating of the stories in the last issue so here goes.

1. "Propagandist", by Murray Leinster.

   A new idea in stories and well handled.

2. "The Person from Porlock," by Raymond F. Jones

   Also a new idea but didn't appeal to me as much as the first one.

3. "Insomnia Inc.," by Harry Walton. Good but not up to the other two.

4. "Rat Race," by George O. Smith

   Not up to his usual level.

I have not rated Hubbard's story since I have not read it yet but if it is anything like "Final Blackout" it should get an unqualified first place.

Since everybody else has something to say about the artwork I will bow to convention and make my

views public. By all means have Rogers do the covers from now on. Cartier is excellent on the interior work. I am not so sure that I like the new type illustrations such as the ones by Timmins for "Propagandist". How about some more Schneeman? I have always liked his work.—Jack C. Rea, Mercer Hotel, Tulsa, Oklahoma.

The gentleman is 100% correct.

Dear Mr. Campbell:

Please examine Mr. Jack Vance's story in your September 1947 issue of Astounding and then tell me this: How can a planetoid, radius 2640 feet, superficial gravity 0.97g, sustain an Earth-normal atmosphere, without benefit of domes and air locks?

The mass is there and so is the superficial gravity, but one very important factor has been overlooked. At a distance of ½ mile above the surface of Earth the acceleration of gravity is $\frac{(3999.5)^2}{(4000)}$ of its surface value or .99975g at a distance ½ mile above Mr. Vance's planetoid the value would be $(½)^2$ or .025g. At 10 miles the values are 0.995g and 0.0025g, respectively. In other words the planetoid's field has such a high gradient that it would be unable to hold any considerable atmosphere. The tidal effects of the Earth's field would also contribute to the description. Temperature does not appear to be available in this particular case.

Don't you suppose you could arrange to loan Mr. Vance a pair of second-hand—Thessian—domes for his next story?—John S. Wolfe, 25 Warder Street, Dayton, Ohio.

One of the other men in our art department copped that original so quick even I didn't get a chance at it.

Dear John:

The painting on your September Astounding cover is completely magnificent. I have compared it with your other covers over the years, and there is nothing that can come within hailing distance of it.

You have discovered the perfect type of cover for the kind of magazine you are trying to turn ASF into. Please, please, please, keep Alejandro on this sort of thing! He outdistances even the magnificent Rogers.

Cartier, of course, is matchless in ASF's interior.

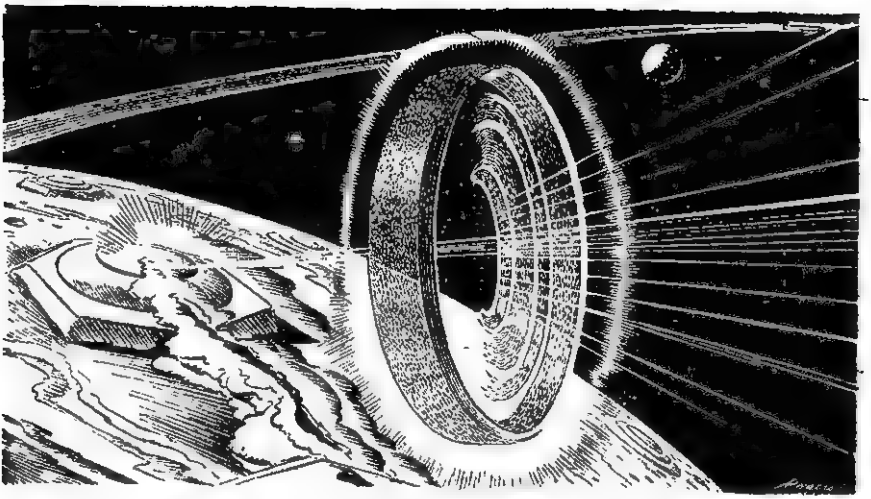
"The End Is Not Yet" is shaping up very well.

Hope to see *Unknown* again someday.

Please continue to use the type of painting you used on this September cover. Could I beg borrow or steal the original? I'd give a first mortgage on my soul for it.

Astounding is—as you already know— producing the finest stuff available on the stands today—Jay F. Chidsey, Green Springs, Ohio.

THE END.



BY E. E. SMITH

CHILDREN OF THE LENS

Illustrated by Rogers

***Concluding** the story of the Children— and also the Galactic Patrol series!*

XXIII.

If the historian has succeeded in his attempt to describe the characters and abilities concerned, it is not necessary to enlarge upon what Kit went through in escaping Eddore. If he has not succeeded, enlargement would be useless. Therefore, it is enough to say that the young Lensman, by dint of calling up and putting out everything he had, hung on long enough and slugged his way through.

Mentor's visualization had been sound. The Eddorian guardians had scarcely taken over the first screen when it was overwhelmed by a tremendous wave of Arisian thought. It is to be remembered, however,

that this was the second time that the massed might of Arisia had been thrown against Eddore's defenses, and the Boskonians had learned much, during the intervening years, from their exhaustive analyses of the offensive and defensive techniques of that earlier conflict. Thus the Arisian drive was practically stopped at the second zone of defense as Kit approached it. The screen was wavering, shifting; yielding stubbornly wherever it must and springing back into place whenever it could.

Under a tremendous concentration of Arisian force the screen weakened in a limited area directly ahead of the hurtling speedster. A few beams lashed out aimlessly, uselessly—if the Eddorians could not hold their main screens proof against the power of the Arisian attack, how could they protect such minor things as gunners' minds? The little ship flashed through the weakened barrier and into the center of a sphere of impenetrable, impermeable Arisian thought.

At the shock of the sudden ending of his terrific battle—the instantaneous transition from supreme to zero effort—Kit fainted in his control chair. He lay slumped, inert, in a stupor which changed gradually into a deep and natural sleep. And as the sleeping man in his inertialess speedster traversed space at full touring blast, that peculiar sphere of force still enveloped and still protected him.

Kit finally began to come to. His first foggy thought was that he was hungry—then, wide awake and remembering, he grabbed his levers.

"Rest quietly and eat your fill," a grave resonant pseudovoice assured him. "Everything is exactly as it should be."

"Hi, Ment . . . well, well, if it isn't my old chum Eukonidor! Hi, young fellow! What's the good word? And what's the big idea of letting—or making—me sleep for a week when there's work to do?"

"Your part of the work, at least for the immediate present, is done; and, let me say, very well done."

"Thanks . . . but—" Kit broke off, flushing darkly.

"Do not reproach yourself, nor us. Consider, please, and recite, the manufacture of a fine tool of ultimate quality."

"The correct alloy. Hot working—perhaps cold, too. Forging—heating—quenching—drawing—"

"Enough. Think you that the steel, if sentient, would enjoy those treatments? While you did not enjoy them, you are able to appreciate their necessity. You are now a finished tool, forged and tempered."

"Oh, you may have something there, at that. But as to ultimate quality, don't make me laugh." There was no nuance of merriment in Kit's thought. "You can't square that with cowardice."

"Nor is there need. The term ultimate was used advisedly, and still stands. It does not mean or imply, however, a state of perfection, since that condition is unattainable. I am not advising you to try to forget; nor am I attempting to force forgetfulness upon you, since your mind

cannot now be coerced by any force presently existing. Be assured that nothing that occurred should irk you; for the simple truth is, that although stressed as no other mind has ever before been stressed, you did not yield. Instead, you secured and retained information which we of Arisia have never been able to obtain; information which will in fact be the means of preserving your Civilization."

"I can't believe . . . that is, it doesn't seem—" Kit, knowing that he was thinking muddily and foolishly, paused and pulled himself together. Overwhelming, almost paralyzing as that information was, it must be true. It *was* true!

"Yes, it is the truth. While we of Arisia have at various times made ambiguous statements, to lead certain Lensmen and others to arrive at erroneous conclusions, you know that we do not lie."

"Yes, I know that." Kit plumbed the Arisian's mind. "It sort of knocks me out of my orbit—that's an awfully big bite to swallow at one gulp, you know."

"It is. That is one reason I am here, to convince you of the truth, which you would not otherwise believe fully. Also to see to it that your rest, without which you might have been hurt, was not disturbed, as well as to make sure that you were not permanently damaged by the Eddorians."

"I wasn't . . . at least, I don't think so . . . was I?"

"You were not."

"Good. I was wondering—Mentor will be tied up for quite a while, of course, so I'll ask you—they must have got a sort of pattern of me, in spite of all I could do, and they'll be camping on my trail from now on, so I suppose I'll have to keep a solid block up all the time?"

"They will not, Christopher, and you need not. Guided by those whom you knew as Mentor, I myself, as a Guardian, am to see to that. But time presses—I must rejoin my fellows."

"One more question first. You've been trying to sell me a bill of goods that I would like to buy. But, Eukonidor, the kids will know that I showed a streak of yellow a meter wide. What will *they think?*"

"Is *that* all?" Eukonidor's thought was almost a laugh. "They will make that eminently plain in a moment."

The Arisian's presence vanished, as did his sphere of force, and four clamoring thoughts came jamming in.

"Oh, Kit, we're *so* glad!" "We *tried* to help, but they wouldn't let us!" "They smacked us down!" "*Honestly,* Kit!" "*Oh,* if we had only been in there, too!"

"Hold it, everybody! Jet back!" This was Con, Kit knew, but an entirely new Con. "Scan him, Cam, as you never scanned anything before. If they burned out even one cell of his mind, I'm going over there right now and kick every one of Mentor's teeth out!"

"And listen, Kit!" This was an equally strange Kathryn blazing with fury and yet suffusing his mind with a more than sisterly tenderness.

a surpassing richness. "If we had had the faintest idea of what they were doing to you, all the Arisians and all the Eddorians and all the devils in all the hells of the macrocosmic Universe couldn't have kept us away. You must believe that, Kit—or can you, quite?"

"Of course, Sis—you don't have to prove an axiom. Seal it, all of you. You're swell people—absolute tops. But I . . . you . . . that is—" He broke off and marshaled his thoughts.

He knew that they knew, in every minute particular, everything that had occurred. Yet to a girl they thought that he was wonderful. Their common thought was that they should have been in there, too—taking what he took—giving what he gave!

"What I don't get is that you are trying to blame yourselves for what happened to me, when you were on the dead center of the beam all the time. You *couldn't* have been in there, kids; it would have blown the whole works higher than up. You knew that then, and you know it even better now. You also know that I flew the yellow flag. Didn't that even *register?*"

"Oh, *that!*" Practically identical thoughts of complete dismissal came in unison, and Karen followed through:

"The only thing about that is that, since you knew what to expect, we marvel that you ever managed to go in at all—no one else could have, possibly. Or, once in, and seeing what was really there, that you didn't flit right out again. Believe me, brother of mine, you qualify!"

Kit choked. This was too much: but it made him feel good all over These kids . . . the Universe's best—

As he thought, a partial block came unconsciously into being. For not one of those gorgeous, those utterly splendid creatures suspected, even now, that which he so surely knew—that each one of them was very shortly to be wrought and tempered as he himself had been. And, worse, he would have to stand aside and watch them, one by one, walk into it. Was there anything he could do to ward off, or even to soften, what was coming to them? There was not. With his present power, he could step in, of course—at what awful cost to Civilization only he, Christopher Kinnison, of all Civilization, really knew. No. That was out. Definitely. He could come in afterwards to ease their hurts, as each had come to him, but that was all—and there was a difference. They hadn't known about it in advance. It was tough.

Could he do *anything?*

He could not.

And on clammy, noisome Eddore, the Arisian attackers having been beaten off and normality restored, a meeting of the Highest Command was held. No two of those entities were alike in form; some were changing from one horrible shape into another; all were starkly, indescribably monstrous. All were concentrating upon the problem which had been so suddenly thrust upon them; each of them thought at and

with each of the others. To do justice to the complexity or the cogency of that maze of intertwined thoughts is impossible; the best that can be done is to pick out a high point here and there.

"This explains the Star A Star whom the Ploorans and the Kalonians so fear."

"And the failure of our operator on Thrale, and its fall."

"Also our recent quite serious reverses."

"Those stupid — those utterly brainless underlings!"

"We should have been called in at the start!"

"Could you analyze, or even perceive, its pattern save in small part?"

"No."

"Nor could I—an astounding and highly revealing circumstance."

"An Arisian; or, rather, an Arisian development, certainly. No other entity of Civilization could possibly do what was done here. Nor could any Arisian as we know or deduce them."

"They have developed something very recently which we had not visualized."

"Kinnison's son? Bah! Think they to deceive us by the old device of energizing a form of ordinary flesh?"

"Kinnison—his son Nadreck—Worsel -Tregonsee—what matters it?"

"Or, as we now know, the completely imaginary Star A Star."

"We must revise our thinking," an authoritatively composite mind decided. "We must revise our theory and our plan. It may be possible that this new development will necessitate immediate, instead of later, action. If we had had a competent race of proxies, none of this would have happened, as we would have been kept informed. To correct a situation which may become grave, as well as to acquire fullest and latest information, we must attend the conference which is now being held on Ploor."

They did so. With no perceptible lapse of time or mode of transit, the Eddorian mind was in an assembly room upon that now flooded world. Resembling Nevians as much as any other race with which man is familiar, the now amphibious Ploorans lolled upon padded benches and argued heatedly. They were discussing, upon a lower level, much of the same material which the Eddorians had been considering so shortly before.

Star A Star. Kinnison had been captured easily enough, but had, almost immediately, escaped from an escape-proof trap. Another trap was set, but would it take him? Would it hold him if it did? Kinnison was—*must* be—Star A Star. No, he could not be, there had been too many unrelated and simultaneous occurrences. Kinnison, Nadreck, Clarrissa, Worsel, Tregonsee, even Kinnison's young son, had all shown intermittent flashes of inexplicable power. Kinnison most of all. It was a fact worthy of note that the beginning of the long series of Boskonian setbacks coincided with Kinnison's appearance among the Lensmen.

The situation was bad. Not irreparable, by any means, but grave. The fault lay with the Eich, and perhaps with Kandron of Onlo. Such stupidity! Such incompetence! Those lower-echelon operators should have had brains enough to have reported the matter to Ploor before the situation got completely out of hand. But they didn't; hence this mess. None of them, however, expressed a thought that the present situation was already one with which they themselves could not cope; nor suggested that it be referred to Eddore before it should become too hot for even the Masters to handle.

"Fools! Imbeciles! We, the Masters, although through no foresight or design of yours, are already here. Know now that you have been and still are yourselves guilty of the same conduct which you are so violently condemning in others." Neither Eddorians nor Ploorans realized that that deficiency was inherent in the Boskonian scheme of things, or that it stemmed from the organization's very top. "Sheer stupidity! Gross overconfidence! Those are the reasons for our recent reverses!"

"But, Masters," a Plooran argued, "now that we have taken over, we are winning steadily. Civilization is rapidly going to pieces. In a few more years we will have smashed it flat."

"That is precisely what they wish you to think. They have been and are playing for time. Your bungling and mismanagement have already given them sufficient time to develop an object or an entity able to penetrate our screens, so that Eddore suffered the disgrace of an actual physical invasion. It was brief, to be sure, and unsuccessful, but it was an invasion, none the less—the first in our long history."

"But, Masters—"

"Silence! We are not here to indulge in recriminations, but to determine facts. Since you do not know Eddore's location in space, it is a certainty that you did not, either wittingly or otherwise, furnish that information. That in turn makes it clear who, basically, the invader was."

"Star A Star?" A wave of questions swept the group.

"One name serves as well as another for what is almost certainly an Arisian entity or device. It is enough for you to know that it is something with which your massed minds would be completely unable to deal. To the best of your knowledge, have you been invaded, either physically or mentally?"

"We have not, Masters; and it is unbelievable that—"

"Is it so?" The Masters sneered. "Neither our screens nor our Eddorian guardsmen gave any alarm. We learned of the Arisian's presence only when he attempted to probe our very minds, at Eddore's very surface. Are your screens and minds, then, so much better than ours?"

"We erred, Masters. We abase ourselves. What do you wish us to do?"

"That is better. You will be informed, as soon as a few last-

minute details have been worked out. Although nothing is established by the fact that you know of no occurrences here on Ploor, the probability is that you are still unknown and unsuspected, since it is unthinkable that the enemies' minds are in any real sense as strong as ours. Nevertheless, one of us is now taking over control of the trap which you set for Kinnison, in the belief that he is Star A Star."

"Belief, Masters? It is certain that he is Star A Star!"

"In essence, yes. In exactness, no. Kinnson is, in all probability, merely a puppet through whom an Arisian works at times. If *you* take Kinnison in that trap, however, the entity you call Star A Star will assuredly kill you all."

"But, Masters—"

"Again, fools, silence!" The thought dripped vitriol. "Remember how easily Kinnison escaped from you? It was the supremely clever move of not following through and destroying you then that obscured the truth for years—that gave them all this additional time. As we have said, you are completely powerless against the one you call Star A Star. Against any lesser force, however—and the probability is exceedingly great that only such forces, if any, will be sent against you—you should be able to win. Are you ready?"

"We are ready, Masters." At last the Ploorans were upon familiar ground. "Since ordinary weapons will be useless against us, they will not attempt to use them—especially since they have developed three extraordinary and supposedly irresistible weapons of attack. First: projectiles composed of negative matter, particularly those of planetary antimass. Second: loose planets, driven inertialess, but inerted at the point at which their intrinsic velocities render collision unavoidable. Third, and worst: the sunbeam. These gave us some trouble, particularly the last, but the problems were solved and if any one of the three, or all of them, are used against us, disaster for the Galactic Patrol is assured.

"Nor did we stop there. Our psychologists, working with our engineers, after having analyzed exhaustively the capabilities of the so-called Second-Stage Lensmen, developed countermeasures against every super-weapon which they will be able to develop during the next century."

"Such as?" The Masters were unimpressed.

"The most probable one is an extension of the sunbeam principle, to operate from a distant sun; or, preferably, a nova. We are now installing fields and grids by the use of which we, not the Patrol, will direct that beam."

"Interesting—if true. Spread in our minds the details of all that you have foreseen and the fashions in which you have safeguarded yourselves."

It was a long operation, even at the speed of thought. At its end the Eddorians were unconvinced, skeptical, and pessimistic.

"We can visualize several other things which the forces of Civiliza-

tion may be able to develop well within the century," the Master mind said, coldly. "We will assemble data concerning a few of them, for your study. In the meantime, hold yourselves in readiness to act, as we shall issue final orders very shortly."

"Yes, Masters," and the Eddorians went back to their home planet as effortlessly as they had left it. There they concluded their conference.

"It is clear that Kinnison will enter that trap. He cannot do otherwise. Kinnison's protector, whoever or whatever he or it may be, may or may not enter it with him. It may or may not be taken with him. Whether or not the new Arisian figment is taken, Kimball Kinnison must die. He is the very keystone of the Galactic Patrol. At his death, as we will advertise it to have come about, the Patrol will fall apart. The Arisians, themselves unknown, will be forced to try to rebuild it around another puppet; but neither his son nor any other man will ever be able to take Kinnison's place in the esteem of the hero-worshiping, undisciplined mob which is Civilization. Hence the importance of your project. You, personally, will supervise the operation of the trap. You, personally, will kill him."

"With one exception, I agree with everything said. I am not at all certain that death is the answer. One way or another, however, I shall deal effectively with Kinnison."

"Deal with? We said kill!"

"I heard you. I still say that mere death may not be adequate. I shall consider the matter at length, and shall submit in due course my conclusions and recommendations, for your consideration and approval."

Although none of the Eddorians knew it, their pessimism in regard to the ability of the Ploorans to defend their planet against the assaults of Second-Stage Lensmen was even then being justified. Kimball Kinnison, after pacing the floor for hours, called his son.

"Kit, I've been working on a thing for months, and I don't know whether I've got a workable solution at last, or not. It may depend entirely on you. Before I go into it, though, I take it that you check me in saying that when we find Boskonia's top planet we're going to have to blow it out of the ether, and that nothing that we have ever used before will work?"

"Check, on both." Kit thought soberly for minutes. "More, it will have to be practically instantaneous, as well as complete. Like the negabombs or the sunbeam, but a lot faster."

"My thought exactly. I've got something, I think, but nobody except old Cardynge and Mentor of Arisia—"

"Hold it, Dad, while I do a bit of spying and put out some coverage. QX, go ahead."

"Nobody except those two knew anything about the mathematics involved. Even Sir Austin knew only enough to be able to understand Mentor's directions—he didn't do any of the deep stuff himself. Nobody in the present Conference of

Science could even begin to handle it. It's that foreign space, you know, that we called the nth space, where that hyperspatial tube dumped us that time. You've been doing a lot of work with some of the Arisians on that sort of stuff. Could you get them to help you compute a tube between Lyrane and there, so that Thorndyke and some of his boys and I could go there and get back?"

"Hm-m-m. Let me think a second. Yes, I can. When do you need it?"

"Today—or even yesterday."

"Too fast. It'll take a couple of days, but it'll be ready for you long before you can get your ship ready and get your gang and the stuff for your gadget aboard her."

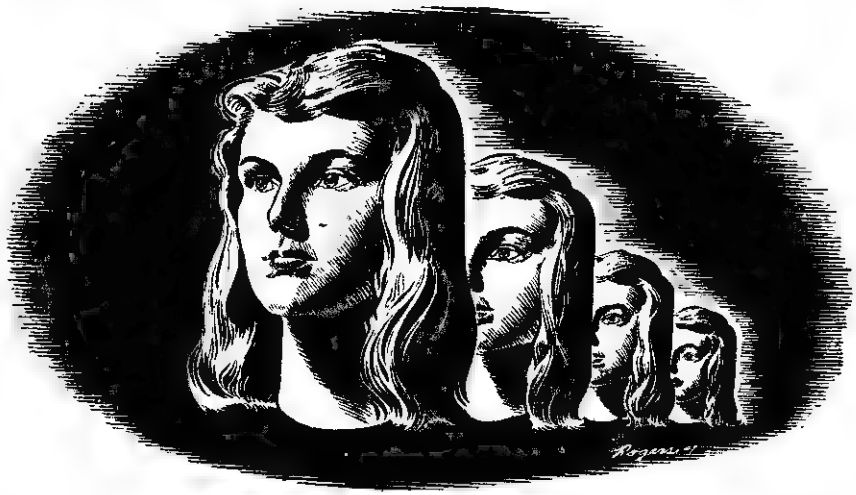
"That won't take so long, son. Same ship we rode before. She's still in commission, you know—*Space Laboratory XII,* her name is now. Special generators, tools, instruments, everything. We'll be ready in two days."

They were, and Kit smiled as he greeted Vice Admiral LaVerne Thorndyke, Principal Technician, and the other surviving members of his father's original crew.

"*What* a tonnage of brass!" Kit said to Kim, later. "Heaviest load I ever saw on one ship. One sure thing, though, they earned it. You must have been able to pick *men,* too, in those days."

"What d'ya mean, 'those days,' you disrespectful young ape? I can still pick *men,* son!" Kim grinned back at Kit, but sobered quickly. "There's more to this than meets the eye. They went through the strain once, and know what it means. They can take it, and just about all of them will come back. With a crew of kids, twenty per cent would be a high estimate."

As soon as the vessel passed System Limits, Kit got another surprise. Even though those men were studded with brass and were, by a boy's standard, *old,* they were not



passengers. In their old *Dauntless* and well away from port, they gleefully threw off their full-dress uniforms. Each donned the clothing of his status of twenty-odd years back and went to work. The members of the regular crew, young as all regular space crewmen are, did not know at first whether they liked the idea of working watch-and-watch with such heavy brass or not, but they soon found out that they did. Those men were men.

It is an ironclad rule of space, however, that operating pilots must be young. Master Pilot Henry Henderson cursed that ruling sulphurously, even while he watched with a proud, if somewhat jaundiced eye, the smooth performance of his son Henry at his own old board.

They approached their destination —cut the jets—felt for the vortex—found it—cut in the special generators. Then, as the fields of the ship reacted against those of the tube, every man aboard felt a malaise to which no being has ever become accustomed. Most men become immune rather quickly to seasickness, to airsickness, and even to spacesickness. Interdimensional acceleration, however, is something else. It is different—just how different cannot be explained to anyone who has never experienced it.

The almost unbearable acceleration ceased. They were in the tube. Every plate showed blank; everywhere there was the same drub and featureless gray. There was neither light nor darkness: there was simply and indescribably — nothing whatever, not even empty space.

Kit threw a switch. There was a wrenching, twisting shock, followed by a deceleration exactly as sickening as the acceleration had been. It ceased. They were in that enigmatic nth space which each of the older men remembered so well; in which so many of their "natural laws" did not hold. Time still raced, stopped, or ran backward, seemingly at whim; inert bodies had intrinsic velocities far above that of light—and so on. Each of those men, about to be marooned of his own choice in this utterly hostile environment, drew a deep breath and squared his shoulders as he prepared to disembark.

"That's computation, Kit!" Kinnison exclaimed after one glance into a plate. "That's the same planet we worked on before, right there. All our machines and stuff, untouched. If you'd figured it any closer, it'd have been a collision course. Are you dead sure, Kit, that everything's all set?"

"Dead sure, Dad, in full duplicate, and Thorndyke and Henderson both know the board."

"QX. Well, fellows, I'd like to stay here with you, and so would Kit, but we've got chores to do. I don't have to tell you to be careful, but I'm going to, anyway. BE CAREFUL! And as soon as you get done, come back home just as fast as Klono will let you. Clear ether, fellows!"

"Clear ether, Kim!"

Lensman father and Lensman son boarded their speedster and left. They traversed the tube and emerged

into normal space, all without a word.

"Kit," the older man ground out, finally. "This gives me the colly wobblies, no less. Suppose some of them—or all of them—get killed out there? Is it worth it? I know it's my own idea, but will we need it badly enough to take the chance?"

"We will, Dad. Mentor says that we will."

And that was that.

XXIV.

Kit had had to get back to normal space as soon as possible, in order to be available in case of need. He wanted to get back in time to help his sisters pull themselves together. Think as he would, he could find no flaw in any one of them; but he knew that Mentor would find something or other the matter with each of them. Not a weakness in any ordinary sense, but a strength which was not the ultimate.

Kinnison had had to get back because his business was really pressing. He had called a conference of all the Second-Stage Lensmen and his children; a conference which, bizarrely enough, was to be held in person and not via Lens.

"Not strictly necessary, of course," the Gray Lensman half-apologized to his son as their speedster neared the point of rendezvous with the *Dauntless*. "I still think that it's a good idea, though, especially since we were all so close to Lyrane anyway."

"So do I. It's been a mighty long time since we were all together. Everybody's there now except Nadreck—he'll board about the same time we do."

They boarded: Spacehounds both, they saw to it that their speedster was dogged down solidly into her chocks before they went to the main saloon.

"Hi, Mums! Still stopping traffic at all intersections, I see!" Kit lowered his mother's feet to the floor and attempted the physically impossible feat of embracing all four of his sisters at once.

By common consent the Five used only their eyes. Nothing showed. Nevertheless, the girls blushed vividly and Kit's face twisted into a dry, wry grin.

"It was good for what ailed us, though, at that—I guess." Kit did not seem to be at all positive. "Mentor, the lug, told me no less than six times that I had arrived—or at least made statements which I interpreted as meaning that. And Eukonidor just told me that I was a 'finished tool,' whatever that means. Personally, I think that they were sitting back and wondering how long it was going to take us to realize that we never could be half as good as we used to think we were. Suppose?"

"Something like that, probably. We've shivered more than once, wondering whether we are really finished products yet or not."

"We've learned—I hope." Karen, hard as she was, did shiver, physically. "If we aren't it will be . . . *p-s-s-t*—Dad's starting the meeting!"

". . . so settle down, all of you, and we'll get going."

What a group! Tregonsee of Rigel IV—stolid, solid, blocky, immobile; looking as little as possible like one of the profoundest thinkers Civilization had ever produced -did not move. Worsel, the ultrasensitive yet utterly implacable Velantian, curled out three or four eyes and looked on languidly while Constance kicked a few coils of his tail onto a comfortable chaise longue, reclined unconcernedly in the seat thus made, and lighted an Alsakanite cigarette. Clarrissa Kinnison, radiant in her Grays and looking scarcely older than her daughters, sat beside Kathryn, each with an arm around the other. Karen and Camilla, neither of whom could ordinarily be described by the adjective "cuddlesome," were on a davenport with Kit, snuggling as close to him as they could get. And in the farthest corner the heavily-armored, heavily-insulated spacesuit which contained Nadreck of Palain VII chilled the atmosphere for yards around.

"QX?" Kinnison began. "We'll take Nadreck first, since he isn't any too happy here, and let him flit—he'll keep in touch from outside after he leaves. Report, please, Nadreck."

"I have explored Lyrane IX *thoroughly.*" Nadreck made the statement and paused. When he used such a thought at all, it meant much. When he emphasized it, which no one there had ever before known him to do, it meant that he had examined the planet practically atom by atom. "There was no life of the level of intelligence in which we are interested to be found on, beneath, or above its surface. I could find no evidence that such life has ever been there, either as permanent dwellers or as occasional visitors."

"When Nadreck settles anything as definitely as that, it stays settled," Kinnison remarked as soon as the Palainian had left. "I'll report next. You all know what I did about Kalonia, and so on. The only significant fact I have been able to find—the only lead to the Boskonian higher-ups—is that Black Lensman Melashikov got his Lens on Lyrane IX. There were no traces of mental surgery. I can see two, and only two, alternatives. Either there was mental surgery which I could not detect, or there were visitors to Lyrane IX who left no traces of their visits. More reports may enable us to decide. Worsel?"

The Second-Stage Lensmen reported in turn. Each had uncovered leads to Lyrane IX, but Worsel and Tregonsee, who had also studied that planet with care, agreed with Nadreck that there was nothing to be found there.

"Kit?" Kinnison asked then. "How about you and the girls?"

"We believe that Lyrane IX was visited by beings having sufficient power of mind to leave no traces whatever as to who they were or where they came from. We also believe that there was no surgery, but an infinitely finer kind of work -an indetectable subconscious compulsion—done on the minds of the

Black Lensmen and others who came into physical contact with the Boskonians. These opinions are based upon experiences which we five have had and upon deductions we have made. If we are right, Lyrane is actually, as well as apparently, a dead end and should be abandoned. Furthermore, we believe that the Black Lensmen have not been and cannot become important."

The Co-ordinator was surprised, but after Kit and his sisters had detailed their findings and their deductions, he turned to the Rigellian.

"What next, then, Tregonsee?"

"After Lyrane IX, it seems to me that the two most promising subjects are those entities who think upon such a high band, and the phenomenon which has been called 'The Hell Hole in Space.' Of the two, I preferred the first until Camilla's researches showed that the available data could not be reconciled with the postulate that the life-forms of her reconstruction were identical with those reported to you as Co-ordinator. This data, however, was scanty and casual. While we are here, therefore, I suggest that we review this matter much more carefully, in the hope that additional information will enable us to come to a definite conclusion, one way or the other. Since it was her research, Camilla will lead."

"First, a question," Camilla began. "Imagine a sun so variable that it periodically covers practically the entire possible range. It has a planet whose atmosphere, liquid, and distance are such that its surface temperature varies from approximately two hundred degrees Centigrade in midsummer to about five degrees absolute in midwinter. In the spring its surface is almost completely submerged. There are terrible winds and storms in the spring, summer, and fall; but the fall storms are the worst. Has anyone here ever heard of such a planet having an intelligent life-form able to maintain a continuing existence through such varied environments by radical changes in its physical body?"

A silence ensued, which Nadreck finally broke.

"I know of two such planets. Near Palain there is an extremely variable sun, two of whose planets support life. All of the higher life-forms, the highest of which are quite intelligent, undergo regular and radical changes, not only of form, but of organization."

"Thanks, Nadreck. That will perhaps make my story believable. From the thoughts of one of the entities in question, I reconstructed such a solar system. More, that entity himself belonged to just such a race. It was *such* a nice reconstruction," Camilla went on, plaintively, "and it fitted all those other life-forms so beautifully, especially Kat's 'four-cycle periods.' And to prove it, Kat —put up your block, now—you never told anybody the classification of your pet to more than seven places, did you, or even thought about it?"

"No." Kathryn's mind, since the moment of warning, had been unreadable.

"Take the seven. The next three were S-T-R. Check?"

"Check."

"But that makes it *solid,* Sis!" Kit exclaimed.

"That's what I thought, for a minute—that we had Boskone at last. However, when Tregonsee and I first felt 'X,' long before you met yours, Kat, his classification was TUUV. That would fit in well enough as a spring form, with Kat's as the summer form. What ruins it, though, is that when he killed himself, just a little while ago and long after a summer form could possibly exist—to say nothing of a spring form—his classification was *still* TUUV. To ten places it was TUUVWYXXWT."

"Well, go on," Kinnison suggested. "What do you make of it?"

"The obvious explanation is that one or all of those entities were planted or primed—not specifically for us, probably, since we are relatively unknown, but for any competent observer. If so, they don't mean a thing." Camilla was not now overestimating her own powers or underestimating those of Boskonia. "There are several others, less obvious, leading to the same conclusion. Tregonsee is not ready to believe any of them, however, and neither am I. Assuming that our data was not biased, we must also account for the fact that the locations in space were—"

"Just a minute, Cam, before you leave the classifications," Constance interrupted. "I'm guarded—what was my friend's, to ten places?"

"VWZYTXSYZY," Camilla replied, unhesitatingly.

"Right; and I don't believe that it was planted, either, so there—"

"Let me in a second!" Kit demanded. "I didn't know that you were on that band at all. I got that RTSL thing even before I graduated—"

"Huh? What RTSL?" Cam broke in, sharply.

"My fault," Kinnison put in then. "Skipped my mind entirely, when she asked me for the dope. None of us thought any of this stuff important until just now, you know. Tell her, Kit."

Kit repeated his story, concluding:

"Beyond four places was pretty dim, but Q P arms and legs – Dhilian, eh?—would fit, and so would an R-type hide. Both Kat's and mine, then, could very well have been summer forms, one of their years apart. The thing I felt was on its own planet, and it *died* there, and credits to millos the thought I got wasn't primed. And the location –"

"Brake down, Kit," Camilla instructed. "Let's settle this thing of timing first. I've got a theory, but I want some ideas from the rest of you."

"Maybe something like this?" Clarrissa asked, after a few minutes of silence. "In many forms which metamorphose completely the change depends upon temperature. No change takes place as long as the temperature remains the same. Your TUUV could have been flitting around in a spaceship at constant

temperature. Could this apply here, Cam, do you think?"

"*Could* it?" Kinnison exclaimed. "That's it, Chris, sure!"

"That was my theory," Camilla said, still dubiously, "but there is no proof that it applies. Nadreck, do you know whether or not it applies to your neighbors?"

"Unfortunately, I do not; but I can find out—by experiment if necessary."

"It might be a good idea," Kinnison suggested. "Go on, Cam."

"Assuming its truth, there is still left the problem of location, which Kit has just made infinitely worse than it was before. Con's and mine were so indefinite that they might possibly have been reconciled with Kat's precisely-known co-ordinates; but yours, Kit, is almost as definite as Kat's, and cannot possibly be made to agree with it. After all, you know, there are many planets peopled by races humanoid to ten places. And if there are four diffent races, none of them can be the one we want."

"I don't believe it," Kit argued. "Not that I think on that peculiar band. I'm sure enough of my dope so that I want to cross-question Kat on hers. QX, Kat?"

"Surely, Kit. Any questions you like."

"Those minds both had plenty of jets—how do you know that he was telling you the truth? Did you drive in to see? Are you sure even that you saw his real shape?"

"Certainly I'm sure of his shape!" Kathryn snapped. "If there had been any zones of compulsion around, I would have known it and got suspicious right then."

"Maybe, and maybe not," Kit disagreed. "That might depend, you know, on how good the guy was who was putting out the zone."

"Nuts!" Kathryn snorted, inelegantly. "But as to his telling the truth about his home planet—I'm not sure of that, no. I didn't check his channels. I was thinking about other things then." The Five knew that she had just left Mentor. "But why should he want to lie about a thing like that—he would have, though, at that. Good Boskonian technique."

"Sure. In your official capacity of Co-ordinator, Dad, what do you think?"

"The probability is that all those four forms of life belong on one planet. Your location must be wrong, Kat—he gave you the wrong galaxy, even. Too close to Trenco, too—Tregonsee and I both know that region like a book and no such variable is anywhere near there. We've got to find out all about that planet as soon as possible. Worsel, will you please get the charts of Kit's region? Kit, will you check with the planetographers of Klovia as to the variable stars anywhere near where you want them, and how many planets they've got? I'll call Tellus."

The charts were studied, and in due time the reports of the planetographers were received. The Klovian scientists reported that there were four long-period variables in the designated volume of space.

gave the spatial co-ordinates and catalogue numbers of each, and all available data concerning their planets. The Tellurians reported only three, in considerably less detail; but they had named each sun and each planet.

"Which one did they leave out?" Kinnison wondered audibly as he fitted the two transparencies together. "This one they call Artonon, no planets. Dunlie, two planets, Abab and Dunster. Descriptions, and so on. Rontieff, one planet that they don't know anything about except the name they have given it. Silly-sounding names—suppose they assemble them by grabbing letters at random? Ploor—"

PLOOR: At last! Only their instantaneous speed of reaction enabled the Five to conceal from the linkage the shrieked thought of what Ploor really meant. After a flashing exchange of thought, Kit smoothly took charge of the conference.

"The planet Ploor should be investigated first, I think," he resumed communication with the group as though his attention had not wavered. "It is the planet nearest the most probable point of origin of that thought-burst. Also, the period of the variable and the planet's distance seem to fit our observations and deductions better than any of the others. Any arguments?"

No arguments. They all agreed. Kinnison, however, demanded action; direct and fast.

"We'll investigate it!" he exclaimed. With the *Dauntless*, the *Z9M9Z*, and Grand Fleet; and with our very special knickknack as an ace up our sleeve!"

"Just a minute, Dad!" Kit protested. "If, as some of this material seems to indicate, the Ploorans actually are the top of the Boskonian culture, even that array may not be enough."

"You may be right—probably are. What, then? What do you say, Tregonsee?"

"Fleet action, yes," the Rigellian agreed. "Also, as you implied, but did not clearly state, independent but correlated action by us five Second-Stage Lensmen, with our various skills. I would suggest, however, that your children be put first—very definitely first—in command."

"We object—we haven't got jets enough to—"

"Overruled!" Kinnison did not have to think to make that decision. He knew. "Any other objections? . . . Approved. I'll call Cliff Maitland right now, then, and get things going."

That call, however, was never sent; for at that moment the mind of Mentor of Arisia flooded the group.

"Children, attend! This intrusion is necessary because a matter has come up which will permit of no delay. Boskonia is now launching the attack which has been in preparation for over twenty years. Arisia is to be the first point of attack. Kinnison, Tregonsee, Worsel, and Nadreck will take immediate steps to assemble the Grant Fleet of the

Galactic Patrol in defense. I will confer at length with the younger Kinnisons.

"The Eddorians, as you know," Mentor went on to the Children of the Lens, "believe primarily in the efficacy of physical, material force. While they possess minds of real power, they use them principally as tools in the development of more and ever more efficient mechanical devices. We of Arisia, on the other hand, believe in the superiority of the mind. A fully competent mind would have no need of material devices, since it could control all material substance directly. While we have made some progress toward that end, and you will make more in the cycles to come, Civilization is, and for some time will be, dependent upon physical things. Hence the Galactic Patrol and its Grand Fleet.

"The Eddorians, after ages of effort, have succeeded in inventing a mechanical generator able to block our most penetrant thoughts. They believe implicitly that their vessels, so protected, will be able to destroy our planet. They may believe that the destruction of our planet would so weaken us that they would be able to destroy us. It is assumed that you children have deduced that neither we nor the Eddorians can be slain by physical force?"

"Yes—the clincher being that no suggestion was made about giving Eddore a planet from nth space."

"We Arisians, during an equally long time, have been aiding Nature in the development of minds much abler than our own. While those minds will not attain their full powers until after many years of work and study, we believe that you will be able, immature as you are, to use the Patrol and its resources to defend Arisia and to destroy the Boskonian fleet. That we cannot do it ourselves is implicit in what I have said."

"But that means . . . this is the big show, then, that you have been hinting at so long?"

"Far from it. An important engagement, of course, but only preliminary to the real test, which will come when we invade Eddore. Do you agree with us that if Arisia were to be destroyed now, it would be difficult to repair the damage done to the morale of the Galactic Patrol?"

"Difficult? It would be impossible!"

"Not necessarily. We have considered the matter at length, however, and have decided that a Boskonian success at this time would not be for the good of Civilization."

"I'll say it wouldn't—that's a masterpiece of understatement if there ever was one! Also, a successful defense of Arisia would be about the best thing that the Patrol could possibly do for itself."

"Exactly so. Go, then, children, and work to that end."

"But how, Mentor—*how?*"

"Again I tell you that I do not know. You have powers—individually, collectively, and as the Unit—about which I know little or nothing. *Use them!*"

XXV.

The "Big Brass"—socially the *Directrix,* technically the *Z9M9Z*—floated through space at the center of a hollow sphere of maulers packed almost screen to screen. She carried the Brains. She had been built around the seventeen million cubic feet of unobstructed space which comprised her "tank"—the three-dimensional chart in which varicolored lights, stationary and moving, represented the positions and motions of solar systems, ships, loose planets, negaspheres, and all other objects and items in which Grand Fleet Operations was, or might become, interested. Completely encircling the tank's more than two thousand feet of circumference was the Rigellian-manned, multimillion-plug board; a crew and a board capable of handling efficiently more than a million combat units.

In the "reducer," the comparatively tiny ten-foot tank set into an alcove, there were condensed the continuously-changing major features of the main chart, so that one man could comprehend and direct the broad strategy of the engagement.

Instead of Port Admiral Haynes, who had conned that reducer and issued general orders during the only previous experience of the *Z9M9Z* in serious warfare, Kimball Kinnison was now in supreme command. Instead of Kinnison and Worsel, who had formerly handled the big tank and the board, there

were Clarrissa, Worsel, Tregonsee, and the Children of the Lens. There also, in a built-in, thoroughly competent refrigerator, was Nadreck. Port Admiral Raoul LaForge and Vice Co-ordinator Clifford Maitland were just coming aboard.

Might he need anybody else, Kinnison wondered. Couldn't think of anybody—he had just about the whole top echelon of Civilization. Cliff and Laf weren't L2's, of course, but they were mighty good men—besides, he *liked* them! Too bad that the fourth officer of their class couldn't be there, too—gallant Wiedel Holmberg, killed in action. At that, three out of four was a high average—mighty high.

"Hi, Cliff—Hi, Laf!"

"Hi, Kim!"

The three old friends shook hands cordially, then the two newcomers stared for minutes into the maze of lights flashing and winking in the tremendous space chart.

"Glad I don't have to try to make sense out of that," LaForge commented, finally. "Looks a lot different in battle harness than on practice cruises. You want me on that forward wall there, you said?"

"Yes. You can see it plainer down here in the reducer. The white star is Arisia. The yellows, all marked, are suns and other fixed points, such as the markers along the arbitrary rim of the Galaxy, running from there to there. Reds will be Boskonians when they get close enough to show. Greens are ours. Up in the big tank everything is identified, but down here there's no room for details—each green light marks the location of a whole operating fleet. That block of green circles, there, is your command. It's about eighty parsecs deep and covers everything within two hours—say a hundred and fifty parsecs—of the line between Arisia and the Second Galaxy. Pretty loose now, of course, but you can tighten it up and shift it as you please as soon as some reds show up. You'll have a Rigellian talker—here he is now—when you want anything done, think at him and he'll give it to the right panel on the board. QX?"

"I think so. I'll practice a bit."

"Now you, Cliff. These green crosses, halfway between the forward wall and Arisia, are yours. You won't have quite as much depth as Laf, but a wider coverage. The green tetrahedrons are mine. They blanket Arisia, you notice, and fill the space out to the second wall."

"Do you think that you and I will have anything to do?" Maitland asked, waving a hand at LaForge's tremendous barrier.

"I wish I could hope that we won't, but I can't. I have it from a usually reliable source that they're going to throw the book. That means hyperspatial tubes as well as open space—they'll probably strike everywhere at once."

Then for weeks Grand Fleet drilled, maneuvered, and practiced. All space within ten parsecs of Arisia was divided into minute cubes, each of which was given a reference number. Fleets were so placed that any point in that space could be reached by at least one fleet

in thirty seconds or less of elapsed time.

Drill went on until, finally, it happened. Constance, on guard at the moment, perceived the slight "curdling" of space which presages the appearance of the terminus of a hyperspatial tube and gave the alarm. Kit, the girls, and all the Arisians responded instantly—all knew that this was to be a thing which not even the Five could handle unaided.

Not one, or a hundred, or a thousand, but at least two hundred thousand of those tubes erupted, practically at once. Kit could alert and instruct ten Rigellian operators every second, and so could each of his sisters; but since every tube within striking distance of Arisia had to be guarded or plugged within thirty seconds of its appearance, and since all of the work was done out in space and not in the tank, it is seen that the Arisians did practically all of the spotting and placing during those first literally incredible two or three minutes.

If the Boskonians could have emerged from a tube's terminus in the moment of its appearance, it is quite probable that nothing could have saved Arisia. As it was, however, the enemy required seconds, or sometimes even whole minutes, to traverse their tubes, which gave the defenders much valuable time.

One of the observers—an Arisian or a Third-Stage Lensman—at first perception of a terminus erupting, noted the number of the threatened space-cubicle, informed the Rigellian operator upon whose panel the number was, and flashed a message to all other observers that that number had been "handled." The observer flashed the number to the Communications board of the flagship of the fleet covering that space; a flash which was automatically relayed to every Communications and Navigations officer of that fleet, and which also automatically called upon Reserve for another fleet to take the place being vacated. Without further orders, the fleet drove toward its target cube. En route, tube-locators mapped the terminus and marked its exact location upon each vessel's tube plates.

Upon arriving, the fleet englobed the terminus and laced itself, by means of tractors and pressors, into a rigid although inertialess structure. Then, if there was time, and because the theory was that the pirates would probably send a negasphere through first, with an intrinsic velocity aimed at Arisia, a suitably equipped loose planet was tossed into "this end" of the tube. Since they might send a loose or an armed planet through first, however, the Fleet Admiral usually threw a negasphere in, too.

What happened when planet met negasphere, in the unknown medium which makes up the "interior" of a hyperspatial tube, is not and probably never will be surely known. Several highly abstruse mathematical treatises and many volumes of rather gruesome fiction have been written upon the subject—none of which, however, has any bearing here.

If the Patrol fleet did not get there

first, the succession of events was different; the degree of difference depending upon how much time the enemy had had. If, as sometimes happened, a fleet was coming through it was met by superatomic bombs and by the concentrated fire of every primary projector that the englobing task force could bring to bear; with consequences upon which it is neither necessary or desirable to dwell. If a planet had emerged, it was met by a negasphere—

Have you ever seen a negasphere strike a planet?

The negasphere is built of negative matter. This material—or, rather, antimaterial—is in every respect the exact opposite of the everyday matter of normal space. Instead of electrons, its ultimate units are positrons—the "Dirac Holes" in an infinity of negative energy. To it a push, however violent, is a pull; a pull is a push. When negative matter strikes positive, then, there is no collision in the usual sense of the word. One electron and one positron neutralize each other and disappear; giving rise to two quanta of extremely hard radiation.

Thus, when the spherical hyperplane which was the aspect of negasphere tended to occupy the same three-dimensional space in which the loose planet already was, there was no actual collision. Instead, the materials of both simply vanished, along the surface of what should have been a contact, in a gigantically crescendo burst of pure, raw energy. The atoms and the molecules of the planet's substance disappeared; the physically incomprehensible texture of the negasphere's antimass changed into that of normal space. And all circumambient space was flooded with inconceivably lethal radiation; so intensely lethal that any being not adequately shielded from it died before he had time to realize that he was being burned.

Gravitation, of course, was unaffected; and the rapid disappearance of the planet's mass set up unbalanced forces of tremendous magnitude. The hot, dense, pseudoliquid magma tended to erupt as the sphere of nothingness devoured so rapidly the planet's substance, but not a particle of it could move. Instead, it vanished. Mountains fell, crashingly. Oceans poured. Earth-cracks appeared; miles wide, tens of miles deep, hundreds of miles long. The world heaved — shuddered — disintegrated—vanished.

The shock attack upon Arisia itself, which in the Eddorian mind had been mathematically certain to succeed, was over in approximately six minutes. Kinnison, Maitland, and LaForge, fuming at their stations, had done nothing at all. The Boskonians had probably thrown everything they could; the probability was vanishingly small that that particular attack was to be or could be resumed. Nevertheless a host of Kinnison's task forces remained on guard and a detail of Arisians still scanned all nearby space.

"What shall I do next, Kit?" Camilla asked. "Help Connie crack that screen?"

Kit glanced at his youngest sister,

who was stretched out flat, every muscle rigidly tense in an extremity of effort.

"No," he decided. "If she can't crack it alone, all four of us couldn't help her much. Besides, I don't believe that she can break through it. That's a mechanical screen, you know, powered by atomic-motored generators. My guess is that it'll have to be *solved,* not cracked, and the solution will take time. When she comes down off of that peak, Kay, you might tell her so, and both of you start solving it. The rest of us have another job. The moppers-up are coming in force, and there isn't a chance that either we or the Arisians can derive the counter-formula of that screen in less than a week. Therefore the rest of this battle will have to be fought out on conventional lines. We can do the most good, I think, by spotting the Boskonians into the big tank—our scouts aren't locating five per cent of them—for the L2's to pass on to Dad and the rest of the heavy brass so that they can run this battle the way it should be run. You'll do the spotting, Cam, of course; Kat and I will do the pushing. And if you thought that Tregonsee took you for a wild ride— It'll work, don't you think?"

"Of *course* it will work—and I like wild rides—the faster the better!"

Thus, apparently as though by magic, red lights winked into being throughout a third of the volume of the immense tank; and the three master strategists, informed of what was being done, heaved tremendous sighs of relief. They now had real control. They knew, not only the positions of their own task forces, but also, and exactly, the position of *every* task force of the enemy. More, by merely forming in his mind the desire for the information, any one of the three could know, with no appreciable lapse of time, the exact composition and the exact strength of any individual one of the horde of Boskonian fleets!

Kit and his two sisters stood close-grouped, motionless; heads bent and almost touching, arms interlocked. Kinnison perceived with surprise that Lenses, as big and as bright as Kit's own, flamed upon his daughters' wrists; a surprise which changed to awe as the very air around those three red-bronze-auburn heads began to thicken, to pulsate, and to glow with that indefinable, indescribable polychromatic effulgence which is so uniquely characteristic of the Lens of the Galactic Patrol. But there was work to do, and Kinnison did it.

Since the *Z9M9Z* was now working as not even the most optimistic of her planners and designers had dared to hope that she ever could work, the war could now be, and was now being fought strategically; that is, with the object of doing the enemy as much harm as possible with the irreducible minimum of risk. It was not sporting. It was not clubby. There was nothing whatever of chivalry. There was no thought whatever of giving the enemy a break. It was massacre—it was murder—it was war.

It was not ship to ship. No, nor fleet to fleet. Instead, ten or twenty Patrol task forces, under sure pilotage, dashed out to englobe at extreme range one fleet of the Boskonians. Then, before the opposing admiral could assemble a picture of what was going on, his entire command became the center of impact of hundreds or even thousands of detonating superatomic bombs, as well as the focus of an immensely greater number of scarcely less ravaging primary beams. Not a ship nor a scout nor a lifeboat of the englobed fleet escaped, ever. In fact, few indeed were the blobs, or even droplets, of hard alloy or of dureum which remained merely liquefied or which, later, were able to condense.

Fleet by fleet the Boskonians were blown out of the ether; one by one the red lights in the tank and in the reducer winked out. And finally the slaughter was done.

Kit and his two now Lensless sisters unlaced themselves. Karen and Constance came up for air, announcing that they knew how to work the problem Kit had handed them, but that they would need more time on it. Clarrissa, white and shaken by what she had driven herself to do, looked and felt sick. So did Kinnison; nor had either of the other two commanders derived any pleasure from the engagement. Tregonsee deplored it. Of all the Lensed personnel, only Worsel had enjoyed himself. He liked to kill enemies, at close range or far, and he could not understand or sympathize with squeamishness. Nadreck, of course, had neither liked nor disliked any part of the whole affair. To him his part had been merely another task, to be performed with the smallest outlay of physical and mental effort consistent with good workmanship.

"What next?" Kinnison asked then, of the group at large. "I say the Ploorans. They're not like these poor devils were—they probably sent them in. *They've* got it coming!"

"They certainly have!"

"Ploor!"

"By all means Ploor!"

"But how about Arisia here?" Maitland asked.

"Under control," Kinnison replied. "We'll leave a heavy guard and a spare tank—the Arisians will do the rest."

As soon as the tremendous fleet had shaken itself down into the course for Ploor; all seven of the Kinnisons retired to a small dining room and ate a festive meal. They drank after-dinner coffee. Most of them smoked. They discussed, for a long time and not very quietly, the matter of the Hell Hole in Space. Finally:

"I know it's a trap, as well as you do." Kinnison got up from the table, rammed his hands into his breeches pockets, and paced the floor. It's got T-R-A-P painted all over it, in bill-poster letters seventeen meters high. So what? Since I'm the only one who can, I've got to go in, if it's still there after we knock Ploor off. And it'll still be there, for all the tea in China. All the Ploorans aren't on Ploor."

Four young Kinnisons flashed thoughts at Kathryn, who frowned and bit her lip. She had hit that hole with everything she had, and had simply bounced. She had been able to block the radiation, of course, but such solid barriers had been necessary that she had blinded herself by her own screens. That it was Eddorian there could be no doubt—warned by her own activities in the other tube—Plooran, of course—and Dad would be worth taking, in more ways than one.

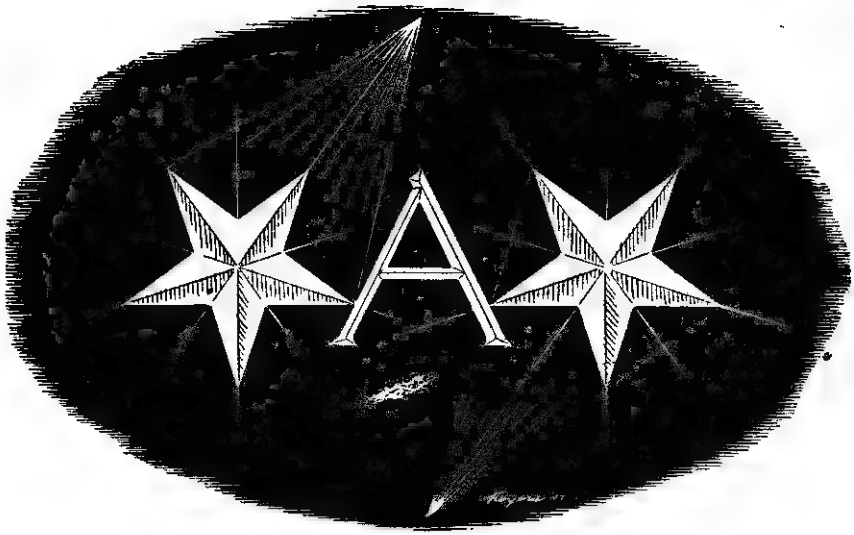
"I can't say that I'm any keener about going in than any of you are about having me to do it," the big Lensman went on, "but unless some of you can figure out a reason for my *not* going in that isn't fuller of holes than a sponge-rubber cushion, I'm going to tackle it just as soon after we blow Ploor apart as I can possibly get there."

And Kathryn, his self-appointed guardian, knew that nothing could stop him. Nor did anyone there, even Clarrissa, try to stop him. Lensmen all, they knew that he had to go in; and why.

To the Five, the situation was not too serious. Kinnison would probably come through unhurt. The Eddorians could take him, of course. But whether or not they could do anything to him after they got him would depend no little on what the Kinnison kids would be doing in the meantime—and that would be plenty. They couldn't delay Dad's entry into the tube very much without making a smell, but they could and would hurry Arisia up. And even if, as seemed probable, Dad was already in the tube when Arisia was ready for the big business with Eddore, a lot could be done at the other end. Those amoeboid monstrosities would be fighting for their own precious lives, this time, not for the lives of slaves; and the Five promised each other grimly that the Eddorians would have too much else to worry about to waste any time on Kimball Kinnison.

Clarrissa Kinnison, however, fought the hardest and bitterest battle of her life. She loved Kim with a depth and a fervor which very few women, anywhere, have ever been able to feel. She knew with a sick, cold certainty, knew with every fiber of her mind and with every cell of her brain, that if he went into that trap he would die in it. Nevertheless, she would have to let him go in. More, and worse, she would have to send him in—to his death—with a smile. She could not ask him not to go in. She could not even suggest again that there was any possibility that he need not go in. He had to go in. He *had* to.

And if Lensman's Load was heavy on him, on her it was almost unbearable. His part was vastly the easier. He would only have to die; she would have to live. She would have to keep on living—without Kim—living a lifetime of deaths, one after another. And she would have to hold her block and smile, not only with her face, but with her whole mind. She could be scared, of course, apprehensive, as he himself was; she could wish with all her strength for his safe return: but if



he suspected the thousandth part of what she really felt it would break his heart. Nor would it do a bit of good. However brokenhearted at her rebellion against the inflexible Code of the Lens, he would still go in. Being Kimball Kinnison, he could not do anything else.

As soon as she could, Clarrissa went to a distant room and turned on a full-coverage block. She lay down, buried her face in the pillow, clenched her fists, and fought.

Was there any way—any *possible* way—that she could die instead? None. It was not that simple.

She would have to let him go.

Not gladly, but proudly and willingly—for the good of the Patrol.

Clarrissa Kinnison gritted her teeth and writhed.

She would simply *have* to let him go into that ghastly trap—go to his absolutely sure and certain death—without showing one white feather, either to her husband or to her children. Her husband, her KIM, would have to die . . . and she—would—*have*—to—live.

She got up, smiled experimentally, and snapped off the block. Then, actually smiling and serenely confident, she strolled down the corridor.

Such is Lensman's Load.

XXVI.

Twenty-odd years before, when the then *Dauntless* and her crew were thrown out of a hyperspatial tube and into that highly enigmatic nth space, LaVerne Thorndyke had been a Chief Technician. Mentor of Arisia found them, and put into the mind of Sir Austin Cardynge, mathematician extraordinary, the knowledge of how to find the way back to normal space. Thorndyke, working under nervebreaking difficulties, had been in charge of build-

ing the machines which were to enable the vessel to return to her home space. He built them. She returned.

He was now again in charge, and every man of his present crew had been a member of his former one. He did not command the spaceship or her regular crew, of course, but they did not count. Not one of those kids would be allowed to set foot on the fantastically dangerous planet to which the inertialess *Space Laboratory XII* was anchored with tractors and pressors.

Older, leaner, grayer, he was now, even more than then, Civilization's Past Master of Mechanism. If anything could be built, "Thorny" Thorndyke could build it. If it couldn't be built, he could build something that would do the work.

As soon as the Gray Lensman and his son left the vessel, Chief Technician Thorndyke—not the vice admiral of the same name—lined his crew up for inspection; men who, although many of them had as much rank and had had as many years of as much authority as their present boss, had been working for days to forget as completely as possible their executive positions and responsibilities. Each man wore not one, but three personal neutralizers, one inside and two outside of his spacesuit. Thorndyke, walking down the line, applied his test kit to each individual neutralizer. He then tested his own. QX all were at max.

"Fellows," he said then, "you all remember what it was like last time. This is going to be the same, except more so and for a longer time. How we did it before without any casualties I'll never know. If we can do it again, it'll be a major miracle—no less. Before, all we had to do was to build a couple of small generators and some controls out of stuff native to the planet, and we didn't find that any too easy a job. This time, for a starter, we've got to build a Bergenholm big enough to free the whole planet; after which we install the Bergs, tube generators, atomic blasts, and other stuff we brought along.

"But that native Berg is going to be a Class A Prime headache, and until we get it running it's going to be hell on wheels. The only way we can get away with it is to check and re-check every thing and every step. Check, check, double-check; then go back and double-check again.

"Remember that the fundamental characteristics of this nth space are such that inert matter can travel faster than light; and remember, every second of the time, that our intrinsic velocity is something like fifteen lights relative to anything solid in this space. I want every one of you to picture himself going inert accidentally. You *might* take a tangent course or higher—but you might not, too. And it wouldn't only kill the one who did it. It wouldn't only spoil our record. It could very easily kill us all and make a crater full of boiling metal out of our whole installation. So BE CAREFUL! Also bear in mind that one piece, however small, of this planet's material, accidentally

brought aboard might wreck the *Dauntless*. Any questions?"

"If the fundamental characteristics—constants –of this space are so different, how do you know that the stuff will work here?"

"Well the stuff we built here before worked. The Arisians told Kit Kinnison that two of the fundamentals, mass and length, are about normal. Time is a lot different, so that we can't compute power-to-mass ratios and so on, but we'll have enough power, anyway, to get any speed that we can use."

"I see. We miss the really fancy stuff?"

"Yes. Well, the quicker we get started the quicker we'll get done. Let's go."

The planet was airless, waterless, desolate; a chaotic jumble of huge and jagged fragments of various metals in a nonmetallic continuous phase. It was as though some playful child-giant of space had poured dipperfuls of silver, of iron, of copper, and of other granulated pure metals into a tank of something else –and then, tired of play, had thrown the whole mess away!

Neither the metals nor the nonmetallic substances were either hot or cold. They had no apparent temperature, to thermometers or to the "feelers" of the suits. The machines which these men had built so long before had not changed in any particular. They still functioned perfectly; no spot of rust or corrosion or erosion marred any part. This, at least, was good news.

Inertialess machines, extravagantly equipped with devices to keep them inertialess, were taken "ashore"; nor were any of these ever to be returned to the ship. Kinnison had ordered and reiterated that no unnecessary chances were to be taken of getting any particle of nth-space stuff aboard *Space Laboratory XII*, and none were taken.

Since men cannot work indefinitely in spacesuits, each man had periodically to be relieved; but each such relief amounted almost to an operation. Before he left the planet his suit was scrubbed, rinsed, and dried. In the vessel's air lock it was air-blasted again before the outer port was closed. He unshelled in the lock and left his suit there—everything which had come into contact with nth-space matter either would be left on the planet's surface or would be jettisoned before the vessel was again inerted. Unnecessary precautions? Perhaps — but Thorndyke and his crew returned unharmed to normal space in undamaged ships.

Finally the Bergenholm was done —by dint of what improvisation, substitution, and artifice only "Thorny" Thorndyke ever knew; at what strain and cost was evidenced by the gaunt bodies and haggard faces of his overworked and underslept crew. To those experts, and particularly to Thorndyke, the thing was not a good job. It was not quiet, nor smooth. It was not in balance, statically, dynamically, or electrically. The chief technician, to whom a meter jump of one and a half thousandths had always been a matter of

grave concern, swore feelingly in all the planetary languages he knew when he saw what those meters were doing.

He scowled morosely. There might have been poorer machines built sometime, somewhere, he supposed—but if so he had never seen any!

But the improvised Berg ran, and kept on running. The planet became inertialess and remained that way. For hours, then, Thorndyke climbed over and around and through the Brobdingnagian fabrication, testing and checking the operation of every part. Finally he climbed down and reported to his waiting crew.

"QX, fellows, a nice job. A good job, in fact, considering—even though we all know that it isn't what any of us would call a good machine. Part of that meter jump, of course, is due to the fact that nothing about the heap is true or balanced, but most of it must be due to this cockeyed ether. Anyway, none of it is due to the usual causes—loose bars and faulty insulation. So my best guess is that she'll keep on doing her stuff while we do ours. One sure thing, she isn't going to fall apart, even under that ungodly knocking; and I don't *think* that she's going to shake herself off of the planet."

After Thorndyke's somewhat less than enthusiastic approval of his brain-child, the adventurers into that fantastic region attacked the second phase of their project. Two Patrol Bergenholms were landed and were installed. Their meters jumped, too, but the engineers were no longer worried about that. *Those* machines would run indefinitely; and a concerted sigh of relief arose when the improvised generator was shut down. Pits were dug. Atomic blasts and other engines were installed, as were many exceedingly complex instruments and mechanisms. A few tons of foreign matter on the planet's surface would now make no difference, but there was no relaxation of the extreme precautions against the transfer of any matter whatever from the planet to the spaceship.

When the job was done, but before the clean-up, Thorndyke called his crew into conference.

"Fellows, I know just what a beating you've been taking. We all feel as though we had been on a Delgonian clambake. Nevertheless, I've got to tell you something. Kinnison said that if we could get this one fixed up without too much trouble, it'd be a mighty good idea to have two of them. What do you say? Did we have too much trouble?"

He got exactly the reaction he had expected.

"Lead us to it!"

"Pick out the one you want!"

"Trouble? It's all over—we can tow this scrap heap on a space line, match intrinsics with clamp-on drivers, and plant it anywhere!"

Another metal-studded, barren, lifeless world was therefore found and prepared, and no real argument arose until Thorndyke broached the matter of selecting the two men

who were to stay with him and Henderson in the two lifeboats which were to remain for a time near the two loose planets after *Space Laboratory XII* had returned to normal space. Everybody wanted to stay. Each one *was* going to stay, too, by all the gods of space, if he had to pull rank to do it!

"Hold it!" Thorndyke commanded. "We'll do the same as we did before, then, by drawing lots. Quartermaster Allerdyce—"

"No!" Uhlenhuth, formerly Atomic Technician 1/c, objected vigorously, and was supported by several others. "He's too clever with his fingers—look what he did to the original draw! We're not squawking about that one, you understand—a little fixing was OX back there—but we want this one to be honest."

"Now that you mention it, I do remember hearing that things were not left entirely to chance." Thorndyke grinned broadly. "So you hold the pot yourself, Uhly, and Hank and I will each pull out one name."

So it was. Henderson drew Uhlenhuth, to that burly admiral's loud delight, and Thorndyke drew Nelson, the erstwhile chief communications officer The two lifeboats disembarked, each near one of the newly "loosened" planets. Two men would stay on or near each of those planets, to be sure that all the machinery functioned perfectly. They would stay there until the atomic blasts functioned perfectly. They would stay there until the atomic blasts went into action and it became clear that the Arisians would need no help in navigating those tremendous globes through nth space to the points at which two hyperspatial tubes were soon to appear.

Long before the advance scouts of the Grand Fleet were within surveying distance of Ploor, Kit and his sisters had spread a completely detailed chart of its defenses in the tactical tank. A white star represented Ploor's sun; a white sphere the planet itself; white Ryerson string lights marked a portion of the planetary orbit. Points of white light, practically all of which were connected to the white sphere by red string lights, marked the directions of neighboring stars and the existence of sunbeams, installed and ready. Pink globes were loose planets; purple ones negaspheres; red points of light were, as before, Boskonian task-force fleets. Blues were mobile fortresses; bands of canary yellow and amber luminescence showed the locations and emplacements of sunbeam grids and deflectors.

Layer after layer of pinks, purples, and blues almost hid the brilliant white sphere from sight. More layers of the same colors, not quite as dense, surrounded the entire solar system. Yellow and amber bands were everywhere.

Kinnison studied the thing briefly, whistling unmelodiously through his teeth. The picture was familiar enough, since it duplicated in practically every respect the chart of the neighborhood of the Patrol's own Ultra Prime, around Klovia. It did not require much study to make it clear that that defense could not be

cracked by any concentration possible of any mobile devices theretofore employed in war.

"Just about what we expected," Kinnison thought to the group at large. "Some new stuff, but not much. What I want to know, Kit and the rest of you, is there anything there that looks as though it was supposed to handle our new baby? Don't see anything, myself."

"There is not," Kit stated definitely. "We looked. There couldn't be, anyway. It can't be handled. Looking backwards at it, they will probably be able to reconstruct how it was done, but in advance? No. Even Mentor couldn't—he had to call in a fellow who has studied ultrahigh mathematics for Klono-only-knows-how-many-millions of years to compute the resultant vectors."

Kit's use of the word "they," which, of course, meant Ploorans to everyone except his sisters, concealed his knowledge of the fact that the Eddorians had taken over the defense of Ploor. Eddorians were handling those screens. Eddorians were directing and correlating those far-flung task forces, with a precision which Kinnison soon noticed.

"Much smoother work than I ever saw them do before," he commented. "Suppose they have developed a *Z9M9Z?*"

"Could be. They copied everything else you invented, why not that?" Again the highly ambiguous "they." "No sign of it around Arisia, though—but maybe they didn't think they'd need it there."

"Or, more likely, they didn't want to risk it so far from home. We can tell better after the mopping-up starts—if the widget performs as per specs. But if your dope is right, this is about close enough. You might tip the boys off, and I'll call Mentor." Kinnison could not reach nth space, but it was no secret that Kit could.

The terminus of one of the Patrol's hyperspatial tubes erupted into space close to Ploor. That such phenomena were expected was evident—a Boskonian fleet moved promptly and smoothly to englobe it. But this was an Arisian tube; computed, installed, and handled by Arisians. It would be in existence only three seconds; the nearest defending task force could not possibly get there in time.

To the observers in the *Z9M9Z* those three seconds stretched endlessly. What would happen when that utterly foreign planet, with its absolutely impossible intrinsic velocity of over fifteen times that of light, erupted into normal space and went inert? Nobody, not even the Arisians, knew.

Everybody there had seen pictures of what happened when the insignificant mass of a spaceship, traveling at only a hundredth of the velocity of light, collided with a planetoid. That was bad enough. This projectile, however, had a mass of about eight times ten to the twenty-first power—an eight followed by twenty-one zeros—metric tons; would tend to travel fifteen hundred times as fast; and kinetic

energy equals mass times velocity squared.

There seemed to be a theoretical possibility, since the mass would instantaneously become some higher order of infinity, that all the matter in normal space would coalesce with it in zero time; but Mentor had assured Kit that operators would come into effect to prevent such an occurrence, and that untoward events would be limited to a radius of ten or fifteen parsecs. Mentor could solve the problem in detail, but since the solution would require some two hundred Klovian years and the event was due to occur in two weeks—

"How about the big computer at Ultra Prime?" Kinnison had asked, innocently. "You know how fast that works."

"Roughly two thousand years — if it could take that kind of math, which it can't," Kit had replied, and the subject had been dropped.

Finally it happened. What happened? Even after the fact none of the observers knew; nor did any except the L3's ever find out. The fuses of all the recorder and analyzer circuits blew at once. Needles jumped instantly to maximum and wrapped themselves around their stops. Charts and ultraphotographic films showed only straight or curved lines running from the origin to and through the limits in zero time. Ploor and everything around it disappeared in an utterly indescribable and completely incomprehensible blast of pure, wild, raw, uncontrolled and uncontrollable energy. The infinitesimal fraction of that energy which was visible, heterodyned upon the ultra as it was and screened as it was, blazed so savagely upon the plates that it seared the eyes.

And if the events caused by the planet aimed at Ploor were indescribable, what can be said of those initiated by the one directed against Ploor's sun?

When the heat generated in the interior of a sun becomes greater than its effective surface is able to radiate, that surface expands. If the expansion is not fast enough, a more or less insignificant amount of the sun's material explodes, thus enlarging by force the radiant surface to whatever extent is necessary to restore equilibrium. Thus come into being the ordinary novae; suns which may for a few days or for a few weeks radiate energy at a rate a few hundreds of thousands of times greater than normal. Since ordinary novae can be produced at will by the collision of a planet with a sun, the scientists of the Patrol had long since completed their studies of all the phenomena involved.

The mechanisms of supernovae, however, remained obscure. No adequate instrumentation had been developed to study conclusively the occasional supernova which occurred naturally. No supernova had ever been produced artificially—with all its resources of mass, atomic energy, cosmic energy, and sunbeams. Civilization could neither assemble nor concentrate enough power.

At the impact of the second loose planet, accompanied by the excess

energy of its impossible and unattainable intrinsic velocity, Ploor's sun became a supernova. How deeply the intruding thing penetrated, how much of the sun's mass exploded, never was and perhaps never will be determined. The violence of the explosion was such, however, that Klovian astronomers reported—a few years later—that it was radiating energy at the rate of some five hundred and fifty million suns.

Thus no attempt will be made to describe what happened when the planet from nth space struck the Boskonians' sun.

It was indescribably curbed.

XXVII.

The Boskonian fleets defending Ploor were not all destroyed, of course. The vessels were inertialess. None of the phenomena accompanying the coming into being of the supernova were propagated at a velocity above that of light; a speed which to any spaceship is scarcely a crawl.

The survivors were, however, disorganized. They had lost their morale when Ploor was wiped out in such a spectacularly nerve-shattering fashion. Also, they had lost practically all of their High Command; for the Ploorans, instead of riding the ether as did Patrol commanders, remained in their supposedly secure headquarters and directed matters from afar. Mentor and his fellows had removed from this plane of existence the Eddorians who had been present in the flesh on Ploor. The Arisians had cut all communications between Eddore and the remnants of the Boskonian defensive force.

Grand Fleet, then, moved in for the kill; and for a time the action near Arisia was repeated. Following definite flight-and-course orders from the *ZoMoZ*, ten or more Patrol fleets would make short hops. At the end of those assigned courses they would discover that they had englobed a task force of the enemy. Bomb and beam!

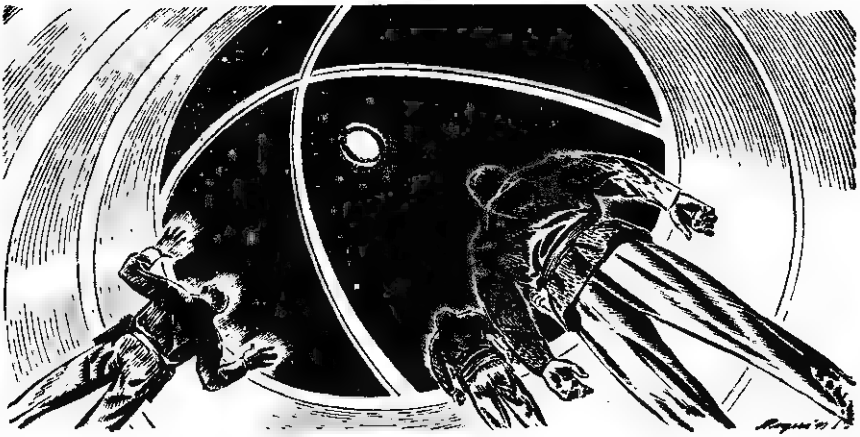
Over and over—flit, bomb, and beam!

One Boskonian high officer, however, had both the time and the authority to act. A full thousand fleets massed together, their heaviest units outward, packed together screen to screen in a close-order globe of defense.

"According to Haynes, that was good strategy in the old days," Kinnison commented, "but it's no good against loose planets and negaspheres."

Six loose planets were so placed and so released that their inert masses would crash together at the center of the Boskonian globe; then, a few minutes later, ten negaspheres of high antimass were similarly launched. After those sixteen missiles had done their work and the resultant had attained an equilibrium of sorts, very little mopping-up was found necessary.

The Boskonian observers were competent. The Boskonian commanders now knew that they had no chance whatever of success; that to stay was to be annihilated; that the only possibility of life lay in



flight. Therefore each remaining Boskonian vice admiral, after perhaps a moment of consultation with a few others, ordered his fleet to drive at maximum blast for his home planet.

"No use chasing them individually, is there, Kit?" Kinnison asked, when it became clear in the tank that the real battle was over; that all resistance had ended. "They can't do anything, and this kind of killing makes me sick at the stomach. Besides, I've got something else to do."

"No. Me, too. So have I." Kit agreed with his father in full.

As soon as the last Boskonian fleet was beyond detector range Grand Fleet broke up, its component fleets setting out for their respective worlds.

"The Hell Hole is still there, Kit," the Gray Lensman said, soberly. "If Ploor was the top—I'm beginning to think there *is* no top—it leads either to an automatic mechanism set up by the Ploorans or to Ploorans who are still alive somewhere. If Ploor was not the top, this seems to be the only lead we have toward that top. In either case I've got to take it. Check?"

"Well, I—" Kit tried to duck, but couldn't. "Yes, Dad, I'm afraid it's check."

Two big hands met and gripped: and Kinnison went to take leave of his wife.

There is no need to go into detail as to what those two strong souls said or did. He knew that he was going into danger; that he might not return. That is, he knew empirically or academically, as a nongermane sort of fact, that he might die. He did not, however, really believe that he would. No man who is not an arrant coward really believes, ever, that any given event will or can kill him. In his own mind he goes on living indefinitely.

Kinnison expected to be captured, imprisoned, questioned, and perhaps tortured. He could understand all of those things, and he did

not like any one of them. That he was more than a trifle afraid and that he hated to leave her now more than he ever had before were both natural enough—he had nothing whatever to hide from her.

She, on the other hand, knew starkly that he would never come back. She knew that he would die in that trap. She knew that she would have to live a lifetime of emptiness, alone. Hence she had much to conceal from him. She must be just as scared and as apprehensive as he was, but no more; just as anxious for their continued happiness as he was, but no more; just as intensely loving, but no more and in exactly the same sense. Here lay the test. She must kiss him good-by as though he were going into mere danger. She *must not* give way to the almost irresistible urge to act in accordance with what she so starkly, chillingly knew to be the truth, that she would never—*never*—NEVER kiss her Kim again!

She succeeded. It is a measure of the Red Lensman's quality that she did not weaken, even when her husband approached the boundary of the Hell Hole and sent what she knew would be his last message.

"Here it is—about a second now. Don't worry—I'll be back very shortly. Clear ether, Chris!"

"Of *course* you will, dear. Clear ether, Kim!"

His speedster did not mount any special generators. He had not thought that they would be necessary. Nor were they. He and his ship were sucked into that trap as though it had been a maelstrom.

He felt again the commingled agonies of interdimensional acceleration. He perceived again the formless, textureless, spaceless void of blankly gray nothingness which was the three-dimensionally-impossible substance of the tube. A moment later, he felt a new and different acceleration—he was speeding up *inside the tube!* Then, very shortly, he felt nothing at all. Startled, he tried to jump up to investigate, and discovered that he could not move. Even by the utmost exertion of his will he could not stir a finger or an eyelid. He was completely immobilized. Nor could he feel. His body was as devoid of sensation as though it belonged to somebody else. Worse, for his heart was not beating. He was not breathing. He could not see. It was as though his every nerve, motor and sensory, voluntary and involuntary, had been separately anaesthetized. He could still think, but that was all. His sense of perception still worked.

He wondered whether he was still accelerating or not, and tried to find out. He could not. He could not determine whether he was moving or stationary. There were no reference points. Every infinitesimal volume of that enigmatic grayness was like each and every other.

Mathematically, perhaps, he was not moving at all; since he was in a continuum in which mass, length and time, and hence inertia and inertialessness, velocity and acceleration, are meaningless terms. He was outside of space and beyond time.

Effectively, however, he was moving; moving with an acceleration which nothing material had ever before approached. He and his vessel were being driven along that tube by every watt of power generable by one entire Eddorian atomic power plant. His velocity, long since unthinkable, became incalculable.

All things end—even Eddorian atomic power was not infinite. At the very peak of power and pace, then, all the force, all the momentum, all the kinetic energy of the speedster's mass and velocity were concentrated in and applied to Kinnison's physical body. He sensed something, and tried to flinch, but could not. In a fleeting instant of what he thought was time he went *past*, not through his clothing and his Lens; *past*, not through, his armor; and *past*, not through, the hard beryllium-alloy structure of his vessel. He even went past but not through the N-dimensional interface of the hyperspatial tube.

This, although Kinnison did not know it, was the Eddorian's climactic effort. He had taken his prisoner as far as he could possibly reach; then, assembling and concentrating all available power, he had given him a catapultic shove into the absolutely unknown and utterly unknowable. The Eddorian did not know any vector of the Lensman's naked flight; he did not care where he went. He did not know and could not compute or even guess at his victim's probable destination.

In what his spacehound's time sense told him was one second, Kinnison passed exactly two hundred million foreign spaces. He did not know how he knew the precise number, but he did. Hence, in the Patrol's measured cadence, he began to count groups of spaces of one hundred million each. After a few days, his velocity decreased to such a value that he could count groups of single millions. Then thousands—hundreds — tens — until finally he could perceive the salient features of each space before it was blotted out by the next.

How could this be? He wondered, but not foggily; his mind was as clear and as strong as it had ever been. Spaces were coexistent, not spread out like this. In the fourth dimension they were flat together, like pages in a book, except thinner. This was all wrong. It was impossible. Since it could not happen, it was not happening. He had not been and could not be drugged. Therefore some Plooran must have him in a zone of compulsion. *What* a zone! *What* an operator the ape must be!

It was, however, real—all of it. What Kinnison did not know, then or ever, was that he was actually outside the boundaries of space; actually beyond the confines of time. He was going past, not through, those spaces and those times.

He was now in each space long enough to study it in some detail. He was an immense distance above this one; at such a distance that he could perceive many globular superuniverses; each of which in turn was

composed of billions of lenticular galaxies.

Through it. Closer now. Galaxies only; the familiar random masses whose apparent lack of symmetrical grouping is due to the limitations of Civilization's observers. He was still going too fast to stop.

In the next space Kinnison found himself within the limits of a solar system and tried with all the force of his mind to get in touch with some intelligent entity upon one—any one—of its planets. Before he could succeed, the system vanished and he was dropping, from a height of a few thousand kilometers, toward the surface of a warm and verdant world, so much like Tellus that he thought for an instant that he must have circumnavigated total space. The aspect, the ice-caps, the cloud-effects, were identical. The oceans, however, while similar, were different; as were the continents. The mountains were larger and rougher and harder.

He was falling much too fast. A free fall from infinity wouldn't give him *this* much speed!

This whole affair was, as he had decided once before, absolutely impossible. It was simply preposterous to believe that a naked man, especially one without blood circulation or breath, could still be alive after spending as many weeks in open space as he had just spent. He *knew* that he was alive. Therefore none of this was happening; even though, as surely as he knew that he was alive, he knew that he was falling.

"Jet back, Lensman!" he thought viciously to himself; tried to shout it aloud.

For this could be deadly stuff, if he let himself believe it. If he believed that he was falling from any such height, he would die in the instant of landing. He would not actually crash; his body would not move from wherever it was that it was. Nevertheless the shock of that wholly imaginary crash would kill him just as dead and just as instantaneously as though all his flesh had been actually smashed into a crimson smear upon one of the neighboring mountain's huge, flat rocks.

"Pretty close, my bright young Plooran friend, but you didn't quite ring the bell," he thought savagely, trying with all the power of his mind to break through the zone of compulsion. "I admit that you're good, but I'm telling you that, if you want to kill me, you'll have to do it physically, and I don't believe that you carry jets enough to swing the job. You might as well cut your zone, because this kind of stuff has been pulled on me by experts, and it hasn't worked yet."

He was apparently falling, feet downward, toward an open, grassy mountain meadow, surrounded by forests, through which meandered a small stream. He was so close now that he could perceive the individual blades of grass in the meadow and the small fishes in the stream, and he was still apparently at terminal velocity.

Without his years of spacehound's training in inertialess maneuvering, he might have died even before he landed, but speed as speed did not

effect him at all. He was used to instantaneous stops from light-speeds. The only thing that worried him was the matter of inertia. Was he inert or free?

He declared to himself that he was free. Or, rather, that he had been, was, and would continue to be motionless. It was physically, mathematically, intrinsically impossible that any of this stuff had actually occurred. It was all compulsion, pure and simple, and he—Kimball Kinnison, Gray Lensman—would not let it get him down. He clenched his mental teeth upon that belief and held it doggedly. One bare foot struck the tip of a blade of grass and his entire body came to a shockless halt. He grinned in relief—this was what he had wanted, but had not quite dared wholly to expect. There followed immediately, however, other events which he had not expected at all.

His halt was less than momentary; in the instant of its accomplishment he began to fall normally the remaining eight or ten inches to the ground. Automatically he sprung his space-trained knees, to take the otherwise disconcerting jar; automatically his left hand snapped up to the place where his controls should have been. *Legs and arms worked!*

He could see with his eyes. He could feel with his skin. He was drawing a breath, the first time he had breathed since leaving normal space. Nor was it an unduly deep breath—he felt no lack of oxygen. His heart was beating as normally as though it had never missed a beat. He was not unusually hungry or thirsty. But all that stuff could wait —where was that Plooran?

Kinnison had landed in complete readiness for strife. There were no rocks or clubs handy, but he had his fists, feet, and teeth; and they would do until he could find or make something better. But there was nothing to fight. Drive his sense of perception as he would, he could find nothing larger or more intelligent than a deer.

The farther this thing went along the less sense it made. A compulsion, to be any good at all, ought to be logical and coherent. It should fit into every corner and cranny of the subject's experience and knowledge. This one did not fit anything or anywhere. It didn't even come close. Yet, technically, it was a marvelous job. He couldn't detect a trace of it. This grass looked and felt real. The pebbles hurt his tender feet so much that he had to wince as he walked gingerly to the water's edge. He drank deeply. The water, real or not, was cold, clear, and eminently satisfying.

"Listen, you misguided what-is-it," he thought probingly, "you might as well open up now as later whatever you've got in mind. If this performance is supposed to be nonfiction, it's a flat bust. If it is supposed to be science-fiction, it isn't much better. If it's a space-opera, even, you're violating all the fundamentals. I've written better stuff myself—Qadgop and Cynthia were a lot more convincing." He waited a moment, then went on:

"Whoever heard of the intrepid hero of a space-opera as big as this one started out to be getting stranded on a completely Earth-like planet and then having nothing happen? No action at all? How about a couple of indescribable monsters of superhuman strength and agility, for me to tear apart with my steel-thewed fingers?"

He glanced around expectantly. No monster appeared.

"Well, then, how about a damsel in distress for me to rescue from a fate worse than death? Better make it two of them—safety in numbers, you know—a blonde and a brunette. No redheads. I'll play along with you part way on that oldie—up to the point of falling for either of them."

He waited again.

"QX, sport, no woman. Suits me perfectly. But I hope you haven't forgotten about the tasty viands. I can eat fish if I have to, but if you want to keep your hero happy, let's see you lay down here, on a platter, a one-kilogram steak, three centimeters thick, medium rare, fried in Tellurian butter and smothered in Venusian superla mushrooms."

No steak appeared, and the Gray Lensman recalled and studied intensively every detail of what had apparently happened. It *still* could not have occurred. He could not have imagined it. It could not have been compulsion or hypnosis. None of it made any kind of sense.

As a matter of plain fact, however, Kinnison's first and most positive conclusion was wrong. His memories were factual records of actual events and things. He would eat well during his stay upon that nameless planet, but he would have to procure his own food. Nothing would attack him, or even annoy him. For the Eddorian's *binding*—this is perhaps as good a word for it as any, since "geas" implies a curse—was such that the Gray Lensman could return to space and time only under such conditions and to such an environment as would not do him any iota of physical harm. He must continue alive and in good health for at least fifty more of his years.

And Clarrissa Kinnison, tense and strained, waited in her room for the instant of her husband's death. They two were one, with a oneness no other man and woman had ever known. If one died, from any cause whatever, the other would feel it.

She waited. Five minutes—ten—fifteen—half an hour—an hour. She began to relax. Her fists unclenched, her shallow breathing grew deeper.

Two hours. Kim was *still alive!* A wave of happy, buoyant relief swept through her; her eyes flashed and sparkled. If they hadn't been able to kill him in two hours, they never could. Her Kim had plenty of jets.

Even the top minds of Boskonia could not kill her Kim!

XXVIII.

The Arisians and the Children of the Lens had known that Eddore must be attacked as soon as possible

after the fall of Ploor. They were fairly certain that the interspatial use of planets as projectiles was new; but they were completely certain that the Eddorians would be able to deduce in a short time the principles and the concepts, the fundamental equations, and the essential operators involved in the process. They would find nth space or one like it in one day; certainly not more than two. Their slaves would duplicate the weapon in approximately three weeks. Shortly thereafter both Ultra Prime and Prime Base, both Klovia and Tellus, would be blown out of the ether. So would Arisia—perhaps Arisia would go first. The Eddorians would probably not be able to aim such planets as accurately as the Arisians had, but they would keep on trying and they would learn fast.

This weapon was the sheer ultimate in destructiveness. No defense against it was possible. There was no theory which applied to it or which could be stretched to cover it. Even the Arisian Masters of Mathematics had not as yet been able to invent symbologies and techniques to handle the quantities and magnitudes involved when those interloping masses of foreign matter struck normal space.

Thus Kit did not have to follow up his announced intention of making the Arisians hurry up. They did not hurry, of course, but they did not lose or waste a minute. Each Arisian, from the youngest guardian up to the oldest philosopher, tuned a part of his mind to Mentor, another part to some one of the millions of Lensmen upon his list, and flashed a message.

"Lensman, attend—keep your mind sensitized to this, the pattern of Mentor of Arisia, who will speak to you as soon as all have been alerted."

That message went throughout the First Galaxy, throughout intergalactic space, and throughout what part of the Second Galaxy had felt the touch of Civilization. It went to Alsakan and Vandemar and Klovia, to Thrale and Tellus and Rigel IV, to Mars and Velantia and Palain VII, to Medon and Venus and Centralia. It went to flitters, battleships, and loose planets. It went to asteroids and moonlets, to planets large and small. It went to newly graduated Lensmen and to Lensmen long since retired; to Lensmen at work and at play. It went to every living wearer of the First-Stage Lens of the Galactic-Patrol.

Wherever the message went, turmoil followed. Lensmen everywhere flashed questions at all the other Lensmen they knew or had ever met.

"What do you make of it, Fred?"

"Did you get the same thing I did?"

"*Mentor!* Grinning Noshabkeming, what's up?"

"Must be big for Mentor to be handling it."

"*Big!* It's immense! Whoever heard of Arisia stepping in before?"

"*Big!* Colossal! Mentor never talked to anybody except Kinnison before, did he?"

Millions of Lensed questions flooded every base and every office

of the Patrol. Nobody, not even the vice co-ordinator, knew a thing.

"You might as well stop sending in questions as to what this is all about, because none of us knows any more about it than you do," Maitland finally sent out a general notice, "Apparently everybody with a Lens is getting the same message, no more and no less. All I can say is that it must be a Class A Prime emergency, and everyone who is not actually tied up in a life-and-death matter will please drop everything and stand by."

Mentor wanted, and had to have, high tension. He got it. Tension mounted higher and higher as eventless hours passed and as, for the first time in history, Patrol business slowed down almost to a stop.

And in a small cruiser, manned by four red-headed girls and one red-headed youth, tension was also building up. The problem of the mechanical screens had long since been solved. Atomic powered counter-generators were in place, ready at the touch of a button to neutralize the mechanically-generated screens of the enemy and thus to make the engagement a mind-to-mind combat. They were as close to Eddore's star-cluster as they could be without giving alarm. They had had nothing to do for hours except wait. They were probably keyed up higher than any other five Lensmen in all of space.

Kit, son of his father, was pacing the floor, chain-smoking. Constance was alternately getting up and sitting down—up—down—up. She, too, was smoking; or, rather, she was lighting cigarettes and throwing them away. Kathryn was sitting, stilly still, manufacturing Lenses which, starting at her wrists, raced up both bare arms to her shoulders and disappeared. Karen was meticulously sticking holes in a piece of blank paper with a pin, making an intricate and meaningless design. Only Camilla made any pretense of calmness, and the others knew that she was bluffing. She was pretending to read a novel; but instead of absorbing its full content at the rate of one glance per page, she had read half of it word by word and still had no idea of what the story was about.

"Are you ready, Children?" Mentor's thought came in at last.

"Ready!" Without knowing how

they got there, the Five found themselves standing in the middle of the room, packed tight.

"Oh Kit, I'm shaking like a fool!" Constance wailed. "I just *know* I'm going to louse up this whole war!"

"QX, baby, we're all in the same fix. Can't you hear my teeth chatter? Doesn't mean a thing. Good teams — champions — all feel the same way before a big game starts. And this is the capital IT.

"Steady down, kids. We'll be QX as soon as the whistle blows— I hope."

"*P-s-s-t!*" Kathryn hissed. "Listen!"

"Lensmen of the Galactic Patrol!" Mentor's resonant pseudovoice filled all space. "I, Mentor of Arisia, am calling upon you because of a crisis in which no lesser force can be of use. You have been informed upon the matter of Ploor. It is true that Ploor has been destroyed; that the Ploorans, physically, are no more. You of the Lens, however, already know dimly that the physical is not the all. Know now that there is a residium of nonmaterial malignancy against which all the physical weapons of all the Universe would be completely impotent. That evil effluvium, intrinsically vicious, is implacably opposed to every basic concept and idea of your Patrol. It has been on the move ever since the destruction of the planet Ploor. Unaided, we of Arisia are not strong enough to handle it, but the massed and directed force of your collective mind will be able to destroy it completely. If you wish me to do so, I will supervise the work of so directing your mental force as to encompass the complete destruction of this menace, which I tell you most solemnly is the last weapon of power with which Boskonia will be able to threaten Civilization. Lensmen of the Galactic Patrol, met as one for the first time in Civilization's long history, what is your wish?"

A tremendous wave of thought, expressed in millions of variant phraseologies, made the wish of the Lensmen very clear indeed. They did not know how such a thing could be done, but they were supremely eager to have Mentor of Arisia lead them against the Boskonians, whoever and wherever they might be.

"Your verdict is unanimous, as I had hoped and believed that it would be. It is well. The part of each of you will be simple, but not easy. You will all of you, individually, think of two things, and of only two. First, of your love for and your pride in and your loyalty to your Patrol. Second, of the clear fact that Boskonia must not and shall not triumph over Civilization. Think these thoughts, each of you with all the strength that in him lies.

"You need not consciously direct those thoughts. Being attuned to my pattern, the force will flow at my direction. As it passes from you, you will replenish it, each according to his strength. You will find it the hardest labor you have ever performed, but it will be of permanent harm to none and it will not be of long duration. One hour will suffice. Are you ready?"

"WE ARE READY!" The cre-

scendo roar of thought must have bulged the Galaxy to its poles.

"Children—strike!"

The Unit struck. The outermost Eddorian screen went down. It struck again, almost instantly. Down went the second. The third. The fourth.

It was that flawless Unit, not Camilla, who detected and analyzed and precisely located the Eddorian guardsman handling each of those far-flung screens. It was the Unit, not Kathryn and Kit, who drilled the pilot hole through each Eddorian's hard-held block and enlarged it into a working orifice. It was the Unit, not Karen, whose impenetrable shield held stubbornly every circular mil of advantage gained in making such ingress. It was the Unit, not Constance, who assembled and drove home the blasts of mental force in which the Eddorians died. No time whatever was lost in consultation or decision. Action was not only instantaneous, but simultaneous with perception. The Children of the Lens were not now five, but one. The UNIT.

"Come in, Mentor!" Kit snapped then. "All you Arisians and all the Lensmen. Nothing specialized—just a general slam at the whole screen. This fifth screen is the works—they've got twenty men on it instead of one, and they're top-notchers. Best strategy now is for us five to lay off for a second or two and show 'em what we've got in the line of defense, while the rest of you fellows give 'em hell!"

Arisia and the massed Lensmen struck, a tidal wave of such tremendous weight and power that under its impact the fifth screen sagged flat against the planet's surface. Any one Lensman's power was small, of course, in comparison with that of any Eddorian, but every First-Stage Lensman of the Galactic Patrol was giving, each according to his strength, and the output of one Lensman, multiplied by the countless millions which was the number of Lensmen then at work, made itself tellingly felt.

Countless? Yes. No one not of Arisia ever knew how many minds contributed to that stupendous flood of force. Bear in mind that in the First Galaxy alone there are over two thousand millions suns: that each sun has, on the average, something over one and thirty-seven hundredths planets inhabited by intelligent life; that about one-half of these planets adhere to Civilization; and that Tellus, an average planet, graduates approximately one hundred Lensmen every year.

"So far, Kit, so good," Constance panted. Although she was no longer trembling, she was still highly excited. "But I don't know how many more shots like that I've . . . we've . . . got left in the locker."

"You're doing fine, Connie," Camilla soothed.

"Sure you are, baby. You've got plenty of jets," Kit agreed. Except in moments of supreme stress these personal, individual exchanges of by-thoughts did not interfere with the smooth functioning of the Unit. "Fine work, all of you, kids. I knew

that we'd get over the shakes as soon as—"

"Watch it!" Camilla snapped. "Here comes the shock wave. Brace yourself, Kay. Hold us together, Kit!"

The wave came. Everything that the Eddorians could send. The Unit's barrier did not waver. After a full second of it—a time comparable to days of continuous atomic bombing in ordinary warfare—Karen, who had been standing stiff and still, began to relax.

"This is too, *too* easy," she declared. "Who is helping me? I can't feel anything, but I simply know that I haven't got this much stuff. You, Cam—or is it all of you?" Not one of the Five was as yet thoroughly familiar with the operating characteristics of the Unit.

"All of us, more or less, but mostly Kit," Camilla decided after a moment's thought. "He's got the weight of an inert planet."

"Not me," Kit denied, vigorously. "Must be you other kids. Feels to me like Kat, mostly. All I'm doing is just sort of leaning up against you a little—just in case. I haven't done a thing so far."

"Oh, no? Sure not!" Kathryn giggled, an infectious chuckle inherited or copied directly from her mother. "We know it, and that you're going to keep on loafing all the rest of the day. You wouldn't think of doing anything, even if you could. Just the same, we're all mighty glad that our big brother is here!"

"QX, kids, seal the chatter. We've had time to learn that they can't crack us—so have they, by the way -so let's get to work."

Since the Unit was now under continuous attack, its technique would have to be entirely different from that used previously. Its barrier must vanish for an infinitesimal period of time, during which it must simultaneously detect and blast. Or, rather, the blast would have to be directed in mid-flight, while the Unit's own block was open. Nor could that block be open for more than the barest possible instant before or after the passage of the bolt. It is true that the attack of the Eddorians compared with that of the Unit very much as the steady pressure of burning propellant powder compares with the disruptive force of detonating duodec; even so it would have wrought much damage to the minds of the Five had any of it been allowed to reach them.

Also, like parachute-jumping, this technique could not be practiced. Since the timing had to be so nearly absolute, the first two shots missed their targets completely; but the Unit learned fast. Eddorian after Eddorian died.

"Help, All-Highest, help!" a high Eddorian appealed, finally.

"What is it?" His Ultimate Supremacy, knowing that only utter desperation could be back of such intrusion, wasted no time.

"It is this new Arisian entity—"

"It is not an entity, fool, but a fusion," came curt reprimand. "We decided that point long ago."

"An entity, I say!" In his ur-

gency the operator committed the unpardonable by omitting the titles of address. "No possible fusion can attain such perfection of timing, of synchronization. Our best fusions have attempted to match it, and have failed. Its screens are impenetrable. Its thrusts cannot be blocked. My message is this: Solve for us, and quickly, the problem of this entity. If you do not or cannot do so, we perish all of us, even to you of the Innermost Circle."

"Think you so?" The thought was a sneer. "If your fusions cannot match those of the Arisians you should die, and the loss will be small."

The fifth screen went down. For the first time in untold ages the planet of Eddore lay bare to the Arisian mind. There were inner defenses, of course, but Kit knew every one; their strengths and their weaknesses. He had long since spread in Mentor's mind an exact and completely detailed chart; they had long since drawn up a completely detailed plan of campaign. Nevertheless, Kit could not keep from advising Mentor:

"Pick off any who may try to get away. Start on Area B and work up. Be sure, though, to lay off of Area K or you'll get your beard singed off."

"The plan is being followed," Mentor assured him. "Children, you have done very well indeed. Rest now, and recuperate your powers against that which is yet to come."

"QX. Unlace yourselves, kids. Loosen up. Unlax. I'll break out a few beakers of fayalin, and all of us—you especially, Con—had better eat ten or fifteen of these candy bars."

"*Eat!* Why, I *couldn't*—" Kit insisted, and Constance took an experimental bite. "But say, I *am* hungry, at that!"

"Of course you are. We've been putting out some stuff, and there's more and worse coming. Now rest, all of you."

They rested. Somewhat to their surprise, they were now seasoned enough campaigners so that they could rest; even Constance. But the respite was short. Area K, the headquarters and the citadel of His Ultimate Supremacy and the Innermost Circle of the Boskonian Empire, contained all that remained of Eddorian life.

"No tight linkage yet, kids," Kit the Organizer went smoothly to work. "Individual effort a flash of fusion, perhaps, now and then, if any of us call for it, but no Unit until I give the word. Then give it everything you've got. Cam, analyze that screen and set us up a pattern for it—you'll find that it'll take some doing. See whether it's absolutely homogenous—hunt for weak spots, if any. Con, narrow down to the sharpest needle you can possibly make and start pecking. Not too hard—don't tire yourself—just to get acquainted with the texture of the thing and keep them awake. Kay, take over our guard so that Eukonidor can join the other Arisians. Kat, come along with me—you'll have to help with the Arisians until I call you into the Unit.

"You Arisians, except Mentor, blanket this dome. Thinner than that—soldier, harder—there. A trifle off-balance yet give me just a little more, here on this side. QX—hold it right there! SQUEEZE! Kat, watch 'em. Hold them right there and in balance until you're sure that the Eddorians aren't going to be able to put any bulges up through the blanket.

"Now, Mentor, you and the Lensmen. Tell them to give us, for the next five seconds, absolutely everything that they can deliver. When they're at absolute peak, hit us with it all. Hit us dead center, and don't pull your punch. We'll be ready.

"Con, get ready to stick that needle there—they'll think it's just another peck, I hope—and prepare to blast as you never blasted before. Kay, get ready to drop that screen and stiffen the needle—when those Lensmen hit us even you will know that you're not just being patted on the back. The rest of us will brace you and keep the shock from killing us all. Here it comes. Make Unit! GO!"

The Unit struck. The needle of pure force drove against the Eddorians' supposedly absolutely impenetrable shield. The Unit's thrust was, of itself, like nothing ever before known. The Lensmen's piledriver blow — the integrated sum total of the top effort of every First-Stage Lensman of the entire Galactic Patrol—was of itself irresistible. Something had to give way.

For an instant it seemed as though nothing were happening or ever would happen. Strong young arms laced the straining Five into a group as motionless and as sculpturesque as statuary, while between their bodies and around them there came into being a gigantic Lens—a Lens whose splendor filled the entire room with radiance.

Under that awful concentration of force something *had* to give way. The Unit held. The Arisians held. The Lensmen held. The needle of force, superlatively braced, neither bent nor broke. Therefore the Eddorians' screen was punctured; and in the instant of its puncturing it disappeared as does a bubble when it breaks.

There was no mopping up to do. Such was the torrent of force cascading into that citadel that within a moment after its shield went down all life within it was snuffed out.

The Boskonian War was over.

XXIX.

"Did you kids come through QX?" The frightful combat over, the dreadful tension a thing of the past, Kit's first thought was for his sisters.

They were unharmed. None of the Five had suffered anything except mental exhaustion. Recuperation was rapid.

"Better we hunt that tube up and get Dad out of it, don't you think?" Kit suggested.

"Have you got a story arranged that will hold together under examination?" Camilla asked.

"Everything except a few minor

details, which we can polish up later."

Smoothly the four girls linked their minds with their brother's; effortlessly the Unit's thought surveyed all nearby space. No hyperspatial tube, nor any trace of one, was there. Tuned to Kinnison's pattern, the Unit then scanned not only normal space and the then present time, but also millions upon millions of other spaces and past and future times; all without finding the Gray Lensman.

Again and again the Unit reached out, farther and farther; out to the extreme limit of even its extraordinary range. Every space and every time was empty. The Children of the Lens broke their linkage and stared at each other, aghast.

They knew starkly what it must mean, but that conclusion was unthinkable. Kinnison—their Dad—the hub of the universe the unshakable, immutable Rock of Civilization—he *couldn't* be dead. They simply could not accept the logical explanations as the true one.

And while they pondered, shaken, a call from their Red Lensman mother impinged upon their consciousness.

"You are together? Good! I have been *so* worried about Kim going into that trap. I have been trying to get in touch with him, but I cannot reach him. You children, with your greater power—"

She broke off as the dread import of the Five's surface thoughts became clear to her. At first she, too, was shaken, but she rallied magnificently.

"Nonsense!" she snapped; not in denial of an unwelcome fact, but in sure knowledge that the supposition was not and could not be a fact. "Kimball Kinnison is alive. He is lost, I know—I last heard from him just before he went into that hyperspatial tube—but I did not feel him die. And if he died, no matter where or when or how, I would most certainly have felt it. So don't be idiots, children, please. Think—*really* think! I am going to do something—somehow—but what? Mentor the Arisian? I've never called him and I'm terribly afraid that he might not be willing to do anything. I could go there and make him do something, but that would take so long—tell me, what shall I—what *can* I do?"

"Mentor, by all means," Kit decided. "The most logical, the only possible solution. I am sure that in this case he will act. It is neither necessary nor desirable to go to Arisia." Now that the Eddorians had ceased to exist, intergalactic space presented no barrier to Arisian thought, but Kit did not enlighten his mother upon that point. "Link your mind with ours." She did so.

"Mentor of Arisia!" the clear-cut thought flashed out. "Kimball Kinnison of Klovia is not present in this, his normal space and time, nor in any other continuum which we can reach. We ask assistance."

"Ah, 'tis Lensman Clarrissa and the Five." Imperturbably, Mentor's mind joined theirs on the instant. I have given the matter no attention, nor have I scanned my visuali-

zation of the Cosmic All. It may be that Kimball Kinnison has passed on from this plane of exist—"

"He has NOT!" the Red Lensman interrupted violently, so violently that her thought had the impact of a physical blow. Mentor and the Five alike could see her eyes flash and sparkle; could hear her voice crackle as she spoke aloud, the better to drive home her passionate conviction. "Kim is ALIVE! I told the children so and I now tell you so. No matter where or when he might be, in whatever possible extra-dimensional nook or cranny of the entire macrocosmic universe or in any possible aisle of time between plus and minus eternity, he could not die—he could not possibly die—without my knowing it. So find him, please—*please* find him, Mentor—or, if you can't or won't, just give me the littlest, *tiniest* hint as to how to go about it and I will find him myself!"

The Five were appalled. Especially Kit, who knew, as the others did not, just how much afraid of Mentor his mother had always been. To direct such a thought as that to any Arisian was unthinkable; but Mentor's only reaction was one of pleased interest.

"There is much of truth, daughter, in your thought," he replied, slowly. "Human love, in its highest manifestation, can be a mighty, a really tremendous thing. The force, the power, the capability of such a love as yours is a sector of the truth which has not been fully examined. Allow me, please, a moment in

which to consider the various aspects of this matter."

It took more than a moment. It took more than the twenty-nine seconds which the Arisian had needed to solve an earlier and supposedly similar Kinnison problem. In fact, a full half hour elapsed before Mentor resumed communication; and then he did so, not to the group as a whole, but only to the Five; using an ultrafrequency to which the Red Lensman's mind could not be attuned.

"I have not been able to reach him. Since you could not do so I knew that the problem would not be simple, but I have found that it is difficult indeed. As I have intimated previously, my visualization is not entirely clear upon any matter touching the Eddorians directly, since their minds were of great

power. On the other hand, their visualizations of us were probably even more hazy. Therefore none of our analyses of each other were or could be much better than approximations.

"It is certain, however, that you were correct in assuming that it was the Ploorans who set up the hyperspatial tube as a trap for your father. The fact that the lower and middle operating echelons of Boskonia could not kill him established in the Ploorans' minds the necessity of taking him alive. The fact gave us no concern, for you, Kathryn, were on guard. Moreover, even if she alone should slip, it was manifestly impossible for them to accomplish anything against the combined powers of you Five. However, at some undetermined point in time the Eddorians took over, as is shown by the fact that you are all at a loss: it being scarcely necessary to point out to you that the Ploorans could neither transport your father to any location which you could not reach nor pose any problem, including his death, which you could not solve. It is thus certain that it was one or more of the Eddorians who either killed Kinnison or sent him where he was sent. It is also certain that, after the easy fashion in which he escaped from the Ploorans after they had captured him and had him all but in their hands, the Eddorians did not care to have the Ploorans come to grips with Kimball Kinnison; fearing, and rightly, that instead of gaining information, they would lose everything."

"Did they know that I was in that tube?" Kathryn asked. "Did they deduce us, or did they think that Dad was a superman?"

"That is one of the many points which are obscure. But it made no difference, before or after the event, to them or to us, as you should perceive."

"Of course. They knew that there was at least one third-level mind at work in the field. They must have deduced that it was Arisian work. Whether it was Dad himself, or whether it was coming to his aid at need, would make no difference. They knew very well that he was the keystone of Civilization, and that to do away with him would be the shrewdest move they could make. Therefore, we still do not understand why they didn't kill him outright and be done with it—if they didn't."

"In exactness, neither do I—that point is the least clear of all. Nor is it at all certain that he still lives. It is sheerest folly to assume that the Eddorians either thought or acted illogically, even occasionally. Therefore, if Kinnison is not dead, whatever was done was calculated to be even more final than death itself. This premise, if adopted, forces the conclusion that they considered the possibility of our knowing enough about the next cycle of existence to be able to reach him there."

Kit frowned. "You still harp on the possibility of his death. Does not your visualization cover that?"

"Not since the Eddorians took control. I have not consciously emphasized the probability of your father's death; I have merely consid-

ered it—in the case of two mutually exclusive events, neither of which can be shown to have happened, both must be studied with care. Assume for the moment that your mother's theory is the truth, that your father is still alive. In that case, what was done and how it was done are eminently clear."

"Clear? Not to us!" the Five chorused.

"While they did not know at all exactly the power of our minds, they could establish limits beyond which neither they nor we could go. Being mechanically inclined, it is reasonable to assume that they had at their disposal sufficient energy to transport Kinnison and his vessel to some point well beyond those limits. They would have given control to a director-by-chance, so that his ultimate destination would be unknown and unknowable. He would of course land safely—"

"How? How could they, *possibly*—?"

"In time that knowledge will be yours. Not now. Whether or not the hypothesis just stated is true, the fact confronting us is that Kimball Kinnison is not now in any region which I am at present able to scan."

Gloom descended palpably upon the Five.

"I am not saying or implying that the problem is insoluble. Since Eddorian minds were involved, however, you already realize that its solution will require the evaluation of many millions of factors and will consume a not inconsiderable number of your years."

"You mean lifetimes!" an impetuous young thought broke in. "Why, long before that—"

"Contain yourself, daughter Constance," Mentor reproved, gently. "I realize quite fully all the connotations and implications involved. I was about to say that it may prove desirable to assist your mother in the application of powers which may very well transcend in some respects those of either Arisia or Eddore." He shifted the band of thought to include the Red Lensman and went on as though he were just emerging from contemplation:

"Children, it appears that the solution of this problem by ordinary processes will require more time than can conveniently be spared. Moreover, it affords a priceless and perhaps a unique opportunity of increasing our store of knowledge. Be informed, however, that the probability is exceedingly great that in this project you, Clarrissa, will lose your life."

"Better not, mother. When Mentor says anything like that, it means suicide. We don't want to lose you, too." Kit pleaded, and the four girls added their pleas to his.

Clarrissa knew that suicide was against the Code—but she also knew that, as long as there was any chance at all, Lensmen always went in.

"Exactly how great?" she demanded, vibrantly. "It isn't absolutely certain—it *can't* be!"

"No, daughter, it is not absolutely certain."

"QX, then, I'm going in. Nothing can stop me."

"Very well. Tighten your linkage,

Clarrissa, with me. Yours will be the task of sending your thought to your husband, wherever and whenever in total space and in total time he may be. If it can be done, you can do it. You alone of all the entities in existence can do it. I can neither help you nor guide you in your quest; but by virtue of your relationship to him whom we are seeking, your oneness with him, you will require neither help nor guidance. My part will be to follow you and to construct the means of his return, but the real labor is and must be yours alone. Take a moment, therefore, to prepare yourself against the effort, for it will not be small. Gather your resources, daughter; assemble all your forces and your every power."

They watched Clarrissa, in her distant room, throw herself prone upon her bed. She closed her eyes, buried her nose in the counterpane, and gripped a side rail fiercely in each hand.

"Can't we help, too?" The Five implored, as one.

"I do not know." Mentor's thought was as passionless as the voice of Fate. "I know of no force at your disposal which can affect in any way that which is to happen. Since I do not know the full measure of your powers, however, it would be well for you to accompany us, keeping yourselves alert to take instant advantage of any opportunity to be of aid. Are you ready, daughter Clarrissa?"

"I am ready," and the Red Lensman launched her thought.

Clarrissa Kinnison did not know, then or ever, did not have even the faintest inkling of what she did or of how she did it. Nor, tied to her by bonds of heritage, love, and sympathy though they were and of immense powers of mind though they were, did any of the Five succeed, until after many years had passed, in elucidating the many complex phenomena involved. Even Mentor, the ancient Arisian sage, never did understand.

All that any of them knew was that an infinitely loving and intensely suffering woman, stretched rigidly upon a bed, hurled out through space and time a passionately questing thought—a thought behind which she put everything she had.

Clarrissa Kinnison, Red Lensman, had much—and every iota of that impressive sum total ached for, yearned for, and insistently *demanded* her Kim—her one and only Kim. Kim her husband; Kim the father of her children; Kim her lover; Kim her other half; Kim her all in all for so many perfect years.

"Kim! KIM! Wherever you are, Kim, or whenever, listen! Listen and answer! Hear me—you *must* hear me calling—I need you, Kim, from the bottom of my soul. Kim! My Kim! KIM!!"

Through countless spaces and through untellable times that poignant thought sped; driven by a woman's fears, a woman's hopes, a woman's all-surpassing love; urged ever onward and ever outward by the irresistible force of a magnificent woman's frankly bared soul.

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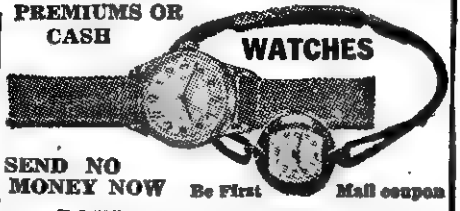

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Outward . . . farther . . . farther out . . . farther—

Clarrissa's body went limp upon her bed. Her heart slowed; her breathing almost stopped. Kit probed quickly, finding that those secret cells into which he had scarcely dared to glance were now empty and bare. Even the Red Lensman's tremendous reserves of vital force were exhausted.

"Mother, come back!"

"Come back to us!"

"Please, *please,* Mums, come back!"

"Know you, children, your mother so little?"

They knew her. They knew starkly that she would not come back. Regardless of any danger to herself, regardless of life itself, she would not return until she had found her Kim.

"But *do* something, Mentor—DO SOMETHING!"

"What? Nothing can be done. It was simply a question of which was the greater; the volume of the required hypersphere or her remarkable store of vitality."

"Shut up!" Kit blazed. "We'll do *something!* Come on, kids, and we'll try."

"The Unit!" Kathryn shrieked. "Link up, quick! Cam, make mother's pattern, all of it—hurry! Now, Unit, grab it—make her one of us, a six-ply Unit—*make* her come in, and snap it up! There! Now, Kit, drive us. DRIVE US!"

Kit drove. As the surging life-force of the Unit pushed a measure of vitality back into Clarrissa's inert body, she gained a little strength and did not grow weaker. The children, however, did; and Mentor, who had been entirely unmoved by the woman's imminent death, became highly concerned.

"Children, return!" He first ordered, then entreated. "You are throwing away not only your lives, but also long lifetimes of intensive labor and study!"

They paid no attention. He had known that they would not. No more than their mother would those children abandon such a mission unaccomplished. Seven Kinnisons would come back or none.

The Arisian pondered—and brightened. Now that a theretofore impossible linkage had been made, the outlook changed. The odds shifted. The Unit's delicacy of web, its driving force, had not been enough; or, rather, it would have taken too long. Adding the Red Lensman's affinity for her husband, however—Yes, definitely, this Unit of his should now succeed.

It did. Before any of the Five weakened to the danger point the Unit, again five-fold, snapped back. Clarrissa's life-force, which had tried so valiantly to fill all of space and all of time, was flowing back into her. A tight, hard beam ran, it seemed, to infinity and vanished. Mentor had been unable to follow the Unit, but he could and did follow that beam to Kimball Kinnison. Abruptly the trace was hidden by the walls of a hyperspatial tube.

"A right scholarly bit of work, children," Mentor approved. "I

could not follow you, but I have arranged the means of his return."

"Thanks, children. Thanks, Mentor." Instead of fainting, Clarrissa sprang from her bed and stood erect. Flushed and panting, eyes flamingly alight, she was more intensely vital than any of her children had ever seen her. Reaction might—would—come later, but she was now all buoyantly vibrant woman. "Where will he come into our space, and when?"

"In your room before you. Now."

Kinnison materialized; and as the Red Lensman and the Gray went hungrily into each other's arms, Mentor and the Five turned their attention toward the future.

"First, the hyperspatial tube which was called the 'Hell Hole in Space,'" Kit began. "We must establish as fact in the minds of all Civilization that the Ploorans were actually at the top of Boskone. The story as we have arranged it is that Ploor was the top, and—which happens to be the truth—that it was destroyed through the efforts of the Second-Stage Lensmen. The 'Hell Hole' is to be explained as being operated by the Plooran 'residuum' which every Lensman knows all about and which he will never forget. The problem of Dad's whereabouts was different from the previous one in degree only, not in kind. To all except us, there never were any Eddorians. Any objections? Will that version hold?"

The consensus was that the story was sound and tight.

"The time has come, then." Ka-

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ren thought, "to go into the very important matter of our reason for being and our purpose in life. You have intimated repeatedly that you Arisians are resigning your Guardianship of Civilization and that we are to take over; and I have just perceived the terribly shocking fact that you four are now alone, that all the other Arisians have already gone. We are not ready, Mentor; you know that we are not—this scares me through and through."

"You are ready, children, for everything that will have to be done. You have not come to your full maturity and power, of course; that stage will come only with time. It is best for you, however, that we leave you now. Your race is potentially vastly stronger and abler than ours. We reached some time ago the highest point attainable to us; we could no longer adapt ourselves to the ever-increasing complexity of life. You, a young new race amply equipped for any emergency within reckonable time, will be able to do so. In capability and in equipment you begin where we leave off."

"But we know—you've taught us —scarcely anything!" Constance protested.

"I have taught you exactly enough. That we do not know exactly what changes to anticipate is implicit in the fact that our race is out of date. Further Arisian teaching would tend to set you in the outdated Arisian mold and thereby defeat our every purpose. As I have informed you repeatedly, we ourselves do not know what extra qualities you possess. Hence we are

in no sense competent to instruct you in the natures or in the uses of them. It is certain, however, that you have those extra qualities. It is equally certain that you possess the abilities to develop them to the full. I have set your feet on the sure way to the full development of those abilities."

"But that will take much time, sir," Kit thought, "and if you leave us now we won't have it."

"You will have time enough and to spare."

"Oh—then we won't have to do it right away?" Constance broke in. "Good!"

"We are all glad of that," Camilla added. "We're too full of our own lives, too eager for experiences, to enjoy the prospect of living such lives as you Arisians have lived. I am right in assuming, am I not, that our own development will in time force us into the same or a similar existence?"

"Your muddy thinking has again distorted the truth," Mentor reproved her. "There will be no force involved. You will gain everything, lose nothing. You have no conception of the depth and breadth of the vistas now just beginning to open to you. Your lives will be immeasurably fuller, higher, greater than any heretofore known to this universe. As your capabilities increase, you will find that you will no longer care for the society of entities less able than your own kind."

"But I don't *want* to live forever!" Constance wailed.

"More muddy thinking." Men-

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tor's thought was—for him—somewhat testy. "Perhaps, in the present instance, barely excusable. You know that you are not immortal. You should know that an infinity of time is necessary for the acquirement of infinite knowledge; and that your span of life will be just as short, in comparison with your capacity to live and to learn, as that of Homo sapiens. When the time comes you will want to—you will need to—change your manner of living."

"Tell us when?" Kat suggested. "It would be nice to know, so that we could get ready."

"I could tell you, since in that way my visualization is clear, but I will not. Fifty years—a hundred—a million—what matters it? Live your lives to the fullest, year by year, developing your every obvious, latent, and nascent capability; calmly assured that long before any need for your services shall arise, you shall have established yourselves upon some planet of your choice and shall be in every respect ready for whatever may come to pass."

"You are—you must be—right," Kit conceded. "In view of what has just happened, however, and the chaotic condition of both galaxies, it seems a poor time to vacate all Guardianship."

"All inimical activity is now completely disorganized. Kinnison and the Patrol can handle it easily enough. The real conflict is finished. Think nothing of a few years of vacancy. The Lensmakers, as you know, are fully automatic, requiring neither maintenance nor attention; what little time you may wish to devote to the special training of selected Lensmen can be taken at odd moments from your serious work of developing yourselves for Guardianship."

"We still feel incompetent," the Five insisted. "Are you sure that you have given us all the instruction we need?"

"I am sure. I perceive doubt in your minds as to my own competence, based upon the fact that in this supreme emergency my visualization was faulty and my actions almost too late. Observe, however, that my visualization was clear upon every essential factor and that we were not actually too late. The truth is that our timing was precisely right—no lesser stress could possibly have prepared you as you are now prepared.

"I am about to go. The time may come when your descendants will realize, as we did, their inadequacy for continued Guardianship. Their visualizations, as did ours, may become imperfect and incomplete. If so, they will then know that the time will have come for them to develop, from the highest race then existing, new and more competent Guardians. Then they, as my fellows have done and as I am about to do, will of their own accord pass on. But that is for the remote future. As to you children, doubtful now and hesitant as is only natural, you may believe implicitly what I now tell you is the truth, that even though we Arisians are no longer here, all shall be well; with us, with you, and with all Civilization."

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The deeply resonant pseudovoice ceased; the Kinnisons knew that Mentor, the last of the Arisians, was gone.

EPILOGUE

To you who have scanned this report, further greetings:

Since I, who compiled it, am only a youth, a Guardian only by title, and hence unable to visualize even approximately either the time of nor the necessity for the opening of this flask of force, I have no idea as to the bodily shape or the mental attainments of you, the entity to whom it has now been made available.

You already know that Civilization is again threatened seriously. You probably know something of the basic nature of that threat. While studying this tape you have become informed that the situation is sufficiently grave to have made it again necessary to force certain selected minds prematurely into the third-level of Lensmanship.

You have already learned that in ancient time Civilization after Civilization fell before it could rise much above the level of barbarism. You know that we and the previous race of Guardians saw to it that this, OUR Civilization, has not yet fallen. Know now that the task of your race, so soon to replace us, will be to see to it that it does not fall.

One of us will become *en rapport* with you as soon as you have assimilated the facts, the connotations, and the implications of this material. Prepare your mind for contact.

Kit Kinnison.

THE END.

THE ANALYTICAL LABORATORY

The November issue of Astounding was one of the hotly contested issues—reader disagreement as to placing, in other words, was considerable, and there was a first-place vote for every story in the list, and a fifth-place vote for every one, too! The result has been fairly high point scores, and a narrower than expected range of scores. Like as follows:

November Issue.

PLACE	STORY	AUTHOR	POINTS
1.	Children of the Lens (I)	E. E. Smith	1.88
2.	Margin for Error	Lewis Padgett	2.45
3.	Tied:		
	Thunder and Roses	Ted Sturgeon	3.14
	The Expensive Slaves	René Lafayette	3.14
4.	Boomerang	Eric Tinde	3.76

One added item of comment deserves mention, an item that can't appear in tabular form. The letters indicated that the general design of the cover was liked, but there were uncomplimentary remarks about the picturization of Kim Kinnisson. I regret that I must agree; in Rogers defense, though, I must add that the painting suffered markedly in reduction from its original two-foot size, and also suffered color value shifts in the photoengraving process. The original was better.

THE EDITOR.

For once they actually agree!

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